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Caravan Winds Up Tour, 30,000 Attend

CLEVELAND — The 1973 edition of the Computer Caravan ended its 10-city tour here last week after attracting about 30,000 attendees.

The typical Caravan attendee, if such a user existed, had a 360/40 or 50 and was seriously considering a switch to a 370 mainframe. As part of his equipment evaluation process, the user was running benchmarks, usually at an IBM data center.

Independent peripherals figured heavily in most users' systems evaluations. In many cases these were tied in with third-party leasing proposals and their many financial options.

Many of the attendees at the sessions on data communications admitted that more extensive planning might have forestalled their network operating problems. And users now planning communications additions to their DP operations said it was difficult to justify the costs to management of implementing a data network.

Ampex Files Counterclaim To L.A. County Damage Suit

CW West Coast Bureau

LOS ANGELES — Ampex Corp. has filed a \$25.5 million counterclaim against Los Angeles County for termination of its contract for a sheriff's video-file system.

Charles Steinberg, Ampex vice-president and general manager of the audio-visual systems division, said the company is seeking \$13.5 million in actual and \$12 million in general damages.

Los Angeles County supervisors had cancelled an \$8.1 million contract and filed a civil suit in Superior Court against Ampex [CW, April 25].

Their suit now seeks \$4.25 million in damages and charges that Ampex did not live up to its contract to provide a usable sheriff's video-file system.

The video-file system was to be used as part of a \$19.5 million system for record storage and retrieval, communications dispatch and microwave transmission.

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'Improve DP Efficiency, Professionalism'

UK Publishes Good Practice Code...

By Joseph Hanlon

Special to Computerworld

LONDON — In an attempt to improve both the image and practice of data processing, the British Computer Society has published a computer code of good practice.

The code has two purposes: "to improve the efficiency and profitability of a computing operation and to increase the

A major purpose... is to "reassure the public that we have a social conscience." — committee member David Coan

level of DP professionalism." The code is a set of 42 checklists designed to aid medium-size users in tightening procedures, reducing cost overruns and improving security.

But the two purposes do apparently conflict. As code committee chairman Dick Waller explained: "One thing runs through the code — money." In the words of the code itself, any part of the code may be rejected "as a normal business risk."

For example, one item suggests that operations personnel should not be allowed to smoke or bring food or drink into the computer room, and that a special room should be provided for this purpose. For night-shift personnel, the code suggests the provision of cooking facilities.

'Reassure Public'

A major purpose in publishing the code is to "reassure the public that we have a social conscience," according to code committee member David Coan. But some critics have charged that any code which can be ignored will not be very reassuring.

Three additions to the code since it was circulated in draft form last year should help pacify, if not reassure, the public.

(Continued on Page 2)

Guide to Output for Non-DPers

The British Computer Society Code of Good Practice suggests the following guidelines on output for non-computer-oriented individuals:

- Documents should be readable with satisfactory print quality.
- Documents should contain both data date and processing date.
- Pages should be numbered.
- Headings should be clear and informative.
- Put carry-forward totals at top and bottom of continuation sheets to assist spot checks of additions.
- Print all factors so that calculation can be checked.
- Identify items.
- Subtotals should add up to document total.

- Reason for charges should be clearly identified.
- Avoid unfamiliar codes and abbreviations.
- Reference information to be quoted should be highlighted for easy identification.
- Reference numbers to be quoted should be as brief as possible.
- Address for reply should be as brief as possible with instructions for personal visitors shown separately.
- In case of query, show a contact with function title, address and telephone number.
- Industry and trade standards should be followed.

...And U.S. Proposes One

By E. Drake Lundell Jr.

CW Washington Bureau

WASHINGTON, D.C. — A "code of ethics" should be implemented for all state and local government data centers, particularly those handling sensitive police information, according to the Government Management Information Sciences Users' Group, which will recommend such a code at its next annual meeting May 12.

In a report now being reviewed by the FBI and other law enforcement organizations here, the group recommended the code of ethics "in order to insure the security, confidentiality and integrity of information sources and resources, especially where criminal justice information system files are maintained."

The proposed code is one of several recommendations contained in a report entitled "An Administrative Guideline: Security and Confidentiality for Government Data Centers" that will be voted on

at the group's annual meeting.

To date, the FBI and other government agencies have not commented on the proposals, which are designed to be adopted nationally and to eliminate the

A code of ethics would "insure the security, confidentiality and integrity of information sources... especially where criminal justice information system files are maintained." — government users' group report

FBI requirement that all computers tied into the Computerized Criminal History system be under the control of law enforcement personnel.

Some state officials have balked at the law enforcement control over computer

(Continued on Page 2)

IBM Built Task Force to Fight 'User Lib'

Telex Suit Documents Tell of 1970 Strategy Against Independents

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. — Because computer users were turning to independent equipment at an ever-increasing rate in 1969 and 1970, IBM was forced to assemble a

Computerworld has assigned its Washington Bureau Chief, E. Drake Lundell Jr., to cover the IBM/Telex suit. This on-site coverage of the trial continues on Pages 4, 8, 9 and 29.

special, secret task force to try to find how to stem the tide and keep users in the fold, testimony in the Telex-IBM antitrust suit here last week revealed.

Earlier in the trial IBM used its time in

cross-examination to try to cast doubt on the reliability of the first two witnesses presented by Telex — both Telex employees.

Because of the willingness of users to use the independent equipment, IBM identified the peripherals area as a "key corporate strategic issue," Richard Whitcomb, a member of that peripherals task force, testified.

Going to Battle

The objectives of the task force were to examine the potential impact of the plug-compatible manufacturers and recommend changes in IBM pricing, policy and product plans to meet the competition, Whitcomb, now with Intel, indicated.

One of the major recommendations of that task force in the product area was to add "mid-life kickers" to products, Whitcomb said.

In other words, he indicated, IBM would withhold certain developments or features on certain products until they had been in the market for a while and

then introduce them — both to confuse the independents' marketing plans and make the users wary of going to the independent devices which the users would feel might soon be outdated by new IBM announcements.

Another policy adopted from task group recommendations concerned reconfiguring products slightly and reducing their prices drastically, Whitcomb claimed.

For example, he said, the 2319 disk drive configuration of the 2314 disk system was "functionally no different" from other members of the system but its price was dropped by about 50%.

In another area, he noted, the 3420 tape drive had a very high commonality of parts with the 2420 and the 2420s coming off lease could be made into 3420s with little trouble or expense. Thus virtually the same product could be sold to the users at a lower price, he said.

In neither case would IBM have to reduce the prices of the earlier units

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IBM Assembled Force to Fight 'User Lib' in 1970

(Continued from Page 1)

installed in the field since the price reductions were only for the newer models — even though those models were basically the same as the earlier ones in the field.

At the same time, Whitcomb indicated that one of the reasons so many users were turning to the independent 2314-type disk drives was the long lead time in IBM delivery since it had a large order backlog.

In addition, Whitcomb testified, IBM had designed a product known internally as the 284X, which was to have been a controller for the 2319B system. It would let users configure a system of from one to nine drives instead of the 2319 system which came in increments of three drives.

This development was apparently made to ensure that users would come back to IBM, if, after the 2319 introduction, it was found users were still turning to the independents for their disk units.

At first, Whitcomb said, it appeared that users would still turn to the independents and the 284X would be introduced, but when the fixed-term plan was introduced, the tide was stemmed and IBM apparently shelved the 284X controller, leaving users with only the choice of 3-spindle, 6-spindle or 9-spindle 2319s.

That users were increasingly turning to the independents, Whitcomb related, could be seen by internal IBM projections showing almost three times as many users had turned to the independents in 1970 as did in 1969. This meant, he said, that IBM has lost almost three times as much

business in 1970 to the competition as the year before.

Losses in the disk area were particularly worrisome, the documents referred to by Whitcomb detailed, since those losses were almost seven times greater in 1970 than in 1969.

Whitcomb said IBM followed a policy of unique, or non-standard, interfacing in the disk drive area partially to cut down the user's choices in equipment when he was looking for new or replacement devices.

Whitcomb also testified that at the beginning of 1971 IBM was generating revenues of \$25 million monthly in the tape drive area and the independents had 7% of the market compared with IBM's 93%.

In the disk area IBM's monthly revenues amounted to \$52 million, and it had 86% of the market, he said. The firm was apparently worried, he stated, because the forecasts made by the task group found disk revenues would drop to \$33 million/mo by 1976 if no actions were taken to improve its position and keep the users.

Earlier in the trial IBM got its chance to cross-examine Harry Ashbridge, product planning vice-president at Telex, and Edward L. Grant, senior Telex vice-president.

Thomas Barr, the IBM trial attorney, hit hard on the sources of Telex information on IBM planned product announcements as revealed in Telex memoranda.

Ashbridge, however, indicated that much of the material in the Telex documents was common knowledge in the computer industry. He cited, as an example, *Computerworld* articles giving some of the details of the system 370 before it was announced — articles, he said, which were remarkably accurate.

Barr also questioned Ashbridge about a meeting held by Telex officials on April 16, 1970, and about the source of information handed out at the meeting by Telex President Jack James.

While Barr admitted later he was trying to indicate the information had come from IBM documents, Ashbridge said he did not recall the documents or the specific meeting cited by Barr.

Barr also claimed the problems experienced by Telex were caused by internal manufacturing problems and not by competition during the time discussed by

Grant.

Although Whitcomb testified on direct examination that in pricing the 3330 disk drive IBM had just considered the independents as competition, Barr on cross-examination got him to admit that in fact the firm had considered the products of the other mainframe makers as well.

Using a document that was challenged by Telex attorney Floyd Walker as being unavailable to Telex during its preparation of the case, Barr got Whitcomb to admit there was a mixture of competition in the business.

Want to Be a Technical Journalist?

BOSTON — If you want to write for a technical publication, but don't really know the ins and outs of getting into print, a one-day seminar, sponsored by Boston University Science Communication Division of the Graduate School of Journalism May 25 may be of help.

Editors of 14 national technical publications headquartered here will explain what they're looking for and how to get stories into the news and feature sections of their publications.

Participants can have lunch with one editor and dinner with another.

Among the topics to be discussed are:

- Which publications are interested in what kinds of articles.
- How to deal with editors.
- What kind of help and guidance is to be expected.
- How to start a book with a series of published articles.

- How to become a newsmaker.
- How to become an occasional staff columnist or guest editorialist.
- How to get different versions of an article in two or more publications as "in-field exclusives."

Publications participating in this seminar include *Circuits Manufacturing*, *Computer Design*, *Computerworld*, *Data and Communications Design*, *Design News*, *Digital Design*, *Electrical Design News*, *Electromechanical Design*, *Laser Focus*, *Microwave Journal*, *Modern Data*, *Modern Materials Handling*, *Plastics World* and *Telecommunications*.

The seminar, "How to Write for Publication," will be held here, and the registration fee of \$75 includes lunch, dinner and cocktails.

Checks should be made payable to Boston University — SPC and sent to Shirley Coyne, Boston University School of Public Communication, 640 Commonwealth Ave., 02215.

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U.S. Group Proposes Code for Government Use

(Continued from Page 1)

systems tied into CCH, claiming it wasted resources when such systems could not be shared with other state and local agencies.

The report is aimed at developing guidelines that would free the states from that regulation and still provide adequate security for such files.

The proposed code of ethics would apply to "all personnel employed by a DP center — in management, systems, programming or operations — and shall be applicable to personnel not directly employed by the center but responsible for terminal interaction with on-line accessibility to center files," according to the report.

The code, the report said, would be administered by a special board of control which would give specific members of a criminal justice agency the responsibility to review a center's personnel and procedures.

"The code of ethics is probably the most unique concept in the administra-

tive guideline and offers the most conclusive deterrent to invasion of privacy since it establishes management authority and appropriate disciplinary action associated with the misuse of government information," the group said.

In an appendix, the report noted the code of ethics in use in Hamilton County (Cincinnati), Ohio, as the possible guideline for the proposed code.

The Hamilton code states that security and confidentiality of information "is a matter of concern of all personnel of the regional computer center and not just of management."

An employee of a government data center with confidential information "holds a position of trust relative to these files and recognizes the responsibilities entrusted to the center and to its employees in preserving the security and confidentiality of these files."

"Therefore," the Hamilton code continues:

- "He does not submit to or permit unauthorized use of any information in

these files.

- "He does not seek to benefit personally or permit others to benefit personally by any confidential information which has come to him by virtue of work assignment.

- "He does not exhibit or divulge the contents of any record except in conduct or his work assignment.

- "He does not knowingly include or cause to be included in any record or report a false, inaccurate or misleading entry.

- "He does not remove or cause to be removed copies or any official record or report from any file from the office where it is kept except in the performance of his duties.

- "He does not operate or request others to operate any [center] equipment unless he is qualified and authorized to do so.

- "He does not use or request others to use any [center] equipment for purely personal business.

- "If he becomes aware of any violation of this section by any [center] personnel, he shall report such conduct to his supervisor immediately."

"Rigid adherence," to the code is required by all employees and any infraction will be construed as misconduct on the part of the employee.

The employee's off-work life is also under the jurisdiction of the code. Any criminal conviction, "conduct prejudicial to the good order of the center, or irresponsibility in meeting financial obligations" might constitute misconduct.

If any infractions are found, the center director is given the authority to investigate them and then report his findings to the law enforcement officials overseeing the center who may either accept his recommendations or overrule them.

However, under the code, the violations apparently do not require any other disciplinary action than what is already on the rule books for violation of the local civil service regulations.

UK Prints Good Practice Code

(Continued from Page 1)

The code now includes guidelines on computer output "which will be received by people who are not computer-oriented." The code also incorporates the 10 principles for handling personal information proposed last year by the government committee on privacy headed by Kenneth Younger.

And the code now stresses that for each system, specific individuals should be given responsibility, in advance, for correcting errors, maintaining and updating programs, maintaining data bases and for the overall performance of the system.

The code is written for three different DP audiences. For the computer professionals, it provides checklists to insure that proper actions have been taken. It

will also help the user to ask the right questions of the DP manager. And the code will be included in courses, such as those run by the UK National Computing Center, for both users and would-be professionals.

One section of the code covers dealings with outside suppliers. It gives rules for setting specifications and writing contracts and lists in detail what should be considered when evaluating suppliers' proposals.

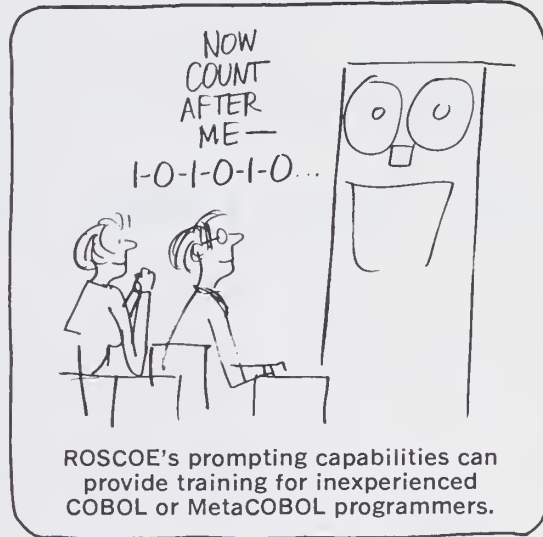
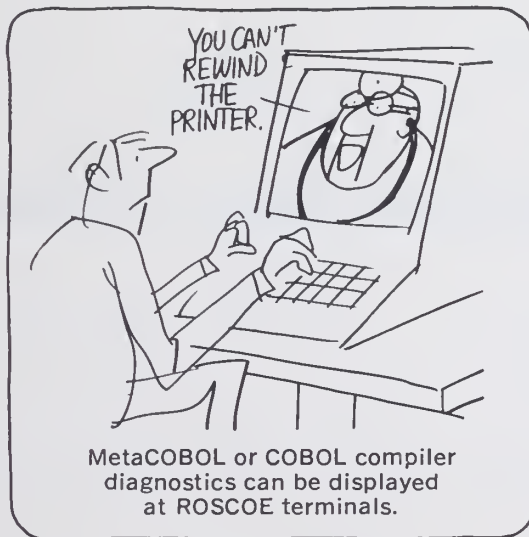
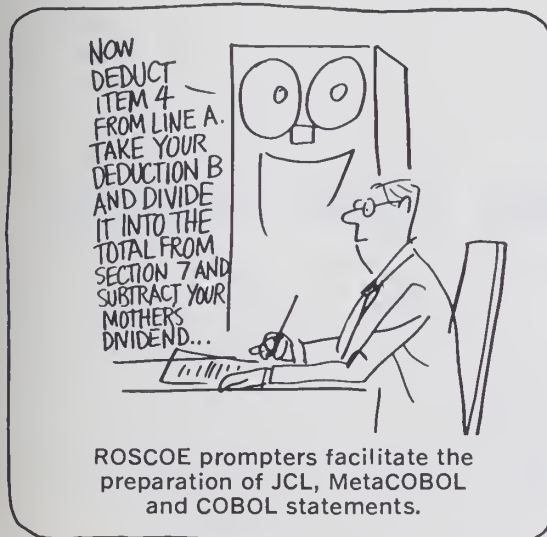
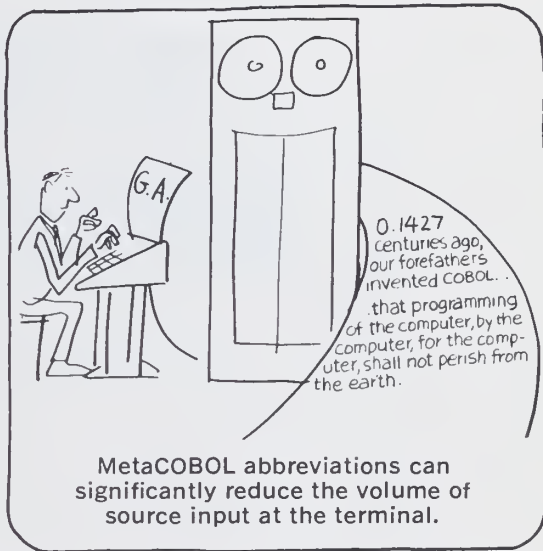
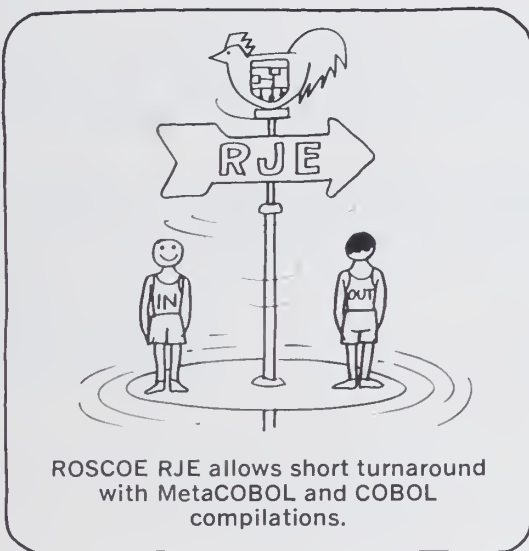
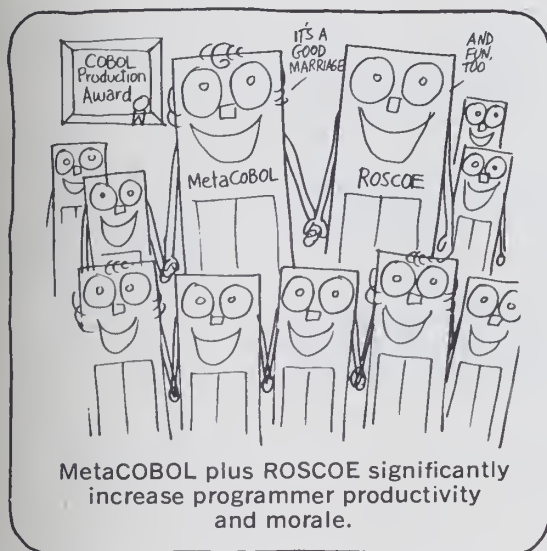
A useful appendix to the code details documentation procedure.

The code is available in the U.S. for \$3 from International Publishing Services, 114 E. 22 St., New York 10016. In the UK, it is available from the National Computing Center, Quay House, Quay St., Manchester M3 3HU.

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Customized by Applications

IBM New Products Should Flow Fast in Next Few Years

TULSA, Okla. — IBM computer users are in for a period of rapid product announcements over the next few years and can possibly expect to see more products designed for only specific applications.

In order to compete with the independent peripheral suppliers IBM plans to step up the rate of product changes and to customize products by applications, according to documents introduced at the IBM-Telex antitrust trial here.

IBM is particularly worried about the competition from the independent peripheral suppliers, because, the documents

indicated, peripherals presently account for almost 70% of the value of some typical IBM systems, up from the 20% in 1955 and 58% in 1965.

What's Ahead?

And while the value has risen, the competition in the peripherals area has also jumped dramatically and "the plug-compatible phenomenon is accelerating in volume and scope."

According to the same untitled IBM confidential document, "plug-compatible peripherals

represent a serious threat to IBM's potential for growth" since peripherals represent such a large part of the systems.

In addition, the document revealed that IBM feels that "defending against" the plug-compatible makers "is difficult once the plug-compatible manufacturer has proven his competence."

"Plug-compatible manufacturers," the document continued, "market on the basis of lower price and generally improved performance... The natural result is that the IBM technological leadership, that translates into price performance, is short-lived."

In "order to compete in this new environment," the document recommended that IBM pursue two philosophies.

"First, more frequent advances in technology utilizing mid-life kickers if possible. Second, pricing should take maximum advantage of our lead, however shortlived."

"In addition," the document went on, "we (IBM) should explore the possibility of reducing the exposure of large quantities of a single peripheral by:

- Customizing devices for narrower ranges of applications.
- Providing wide ranges of price/performance and capability for device families."

In a survey of more than 10,000 user sites IBM found that plug-compatible firms had "contaminated" 13% of them and that the measure was expected to increase rapidly.

In only a few cases did IBM "win" an installation based on superior technology, the survey found. Other reasons given for

System 375 in 1975?

TULSA, Okla. — The IBM System 375 is on course.

Documents disclosed here in the IBM/Telex antitrust suit showed that the announcement of the new family of computer systems should come in 1975, although no details have been uncovered as yet on the structure of the systems.

It will have a new disk unit, however, known internally in IBM as the Apollo, which will be a significant improvement over the present 3330 devices.

The capacity of the device will be 10^7 bytes per drive and it will have a data rate of 1.6 kbyte/sec and an average access time of between 10 msec and 20 msec.

The unit will have 400 track/in. and will store 8,000 bit/in. and will rotate at 3,600 rpm, the documents showed.

But there is some bad news for the users — the media for the unit will be non-interchangeable, presumably with any earlier devices. In addition, it will have a new control unit, which was not named at the time the documents were prepared.

Also, the Durango tape drive, of which little is now known, is scheduled for release a year after the 375 System is announced and will probably be designed solely for its use.

The designation of 375 found in the IBM documents seems to indicate the unit will not be a radical departure from the present 370 generation of systems. In fact, some observers indicated it could be a true interim generation.

What Profit From a Product?

TULSA, Okla. — How much profit does IBM plan to make when it introduces a new product?

A lot, according to documents released here in the Telex-IBM antitrust suit.

For example, the profit expected from the 3330 disk drive over its life span was expected to be 33.8% before taxes, with the profit on leased machines put at 32.1% and 41.4% on purchased, which might indicate that the profit levels were set to get users to lease rather than buy the units.

This could be particularly true now that the leasing companies are primarily out of the market for new IBM equipment and tend to purchase most peripherals from independents as part of third-party package deals.

On the 3830 storage control unit, however, the situation is a little different. The total profit from the product was set at 40.8% of the revenue over its expected life, with 41.8% of the lease revenue being profit and 37.2% of the purchase revenues going into the pre-tax profit column.

Of course, those profit levels were for the expected life of the product, estimated to be 58 months for the 3330 and 57 months for the 3830.

But IBM prices the units on a shorter time span — in other words, it still expects to make substantial profits after 48 months on both products.

For example, the 3830 would produce a 37.8% profit if only in use for 48 months — or \$314.5 million over the four-year period from introduction. The 3330, however — if in the field only four years — would only give a profit of 28.8% of the total revenues, or \$406.3 million over the four-year period.

beating the independents included "account control, report, salesmanship" and "dependence upon IBM FE service," it was found.

IBM "loses," however, based on price, performance and functional differences, IBM said.

In the new environment, IBM found that any of its devices could be marketed at under the IBM price for the units and that peripherals must compete on a box-for-box basis.

To meet the competition, the research group recommended that IBM allow 24-hour use on all I/O devices without extra charges and that it adopt "competitive margins" in pricing its products.

In addition, it recommended that the firm reevaluate its

planned programs and begin offering mid-life enhancements to products in the field.

In the past, the researchers told top management, "IBM has waited too long to take action in product after product... In a price war we cannot follow down fast enough to remain competitive. Reactive pricing is a poor strategy. It's time to recognize the new environment, modify our policies accordingly, and reassert IBM's market leadership."

In both the tape and disk areas, the IBM study group found that losses to the plug-compatible manufacturers were continuing into the projected future and that the IBM "planned program was not adequate" to meet the increased competition.

Task Force Found Independents Making Vital Inroads

TULSA, Okla. — The Peripherals Task Force of IBM found that the situation in the tape market in 1970 was serious, even though it estimated that the independent peripherals makers had a small share of the market at that time.

The group found that IBM customers were buying tape and other plug-compatible products from the independents based largely on price, but it noted the equipment from these suppliers was "equal or better" on a functional basis than the IBM devices being replaced.

The Tape Competition

The task group estimated that with the present market plans the tape suppliers would be able to grab 11% of the units shipped by 1976 and that would account for about 10% of the revenues of the business as counted in IBM "points" at that time.

However, while the independents would only account for around 10% of the total market, the IBM planners felt this would be approximately 22% of the lease base of units in the field in 1973 and 16% of the total lease base by 1976. IBM usually tries

to protect the important lease base.

The IBM planners found the independents would aim their marketing at the "broad IBM tape market," and their particular target in the 1970-73 time period would be 7- and 9-track NRZI, 9-track Phase Encoded, the 2420 and the 2803 control unit.

In the 1972 to 1975 period the target, the IBM planners said, would be the Aspen-type drives and the Aspen control units, the code names for devices that later became the 3420 system.

In the 1973 to 1976 period, however, it was found the independents would switch their emphasis to the "Eldora," "Winter Park" and "Monarch" units that IBM was then developing.

IBM's Strategy

The overall strategy IBM should develop, therefore, was to "move users to on-line storage devices" and "at the same time protect the half-inch tape market," the IBM researchers recommended.

Ultimately, according to the documents, IBM planned to move most tape users to a product called the "Durango" by the 1976 time span. In other

A Serious Situation in 1970

In 1970 IBM was worried because the conditions in the plug-compatible peripherals market had reached a "serious but not runaway situation," according to secret IBM documents introduced in the Telex antitrust suit against IBM.

A secretly assembled "Peripherals Task Force" was then put together by IBM to recommend programs that could be accelerated in order to meet the competition and keep it off balance.

The programs recommended by the task force "will reduce (IBM's) risk and improve our quantities," the report's conclusion indicated.

To meet the competition and retain a larger share of the revenues in the business, the plan drawn up by this task force was divided into two parts — one on disk and one on tape.

What follows is a look at both of those markets as seen by IBM during 1970 and the recommended actions, most of which seem to have been followed until now.

words, all the planned products in the tape market led to Durango.

One step in this upgrading program set for introduction in the second half of this year will be the Aspen II unit which will be a follow-on to the 3420 with a higher density, the documents revealed. The unit is scheduled to be shipped a year later.

The Durango unit itself, which is only briefly touched on in these documents, is slated for announcement sometime in 1976 and will be delivered in 1977.

The intermediate step seems to be the "Kiowa" family of drives, which will include, in addition to the already announced 3420, the Eldora drive, Winter Park drive and the Monarch drive.

Basically, the units will have a 6400 bit/in. basic density, and will feature 1,600 bit/in. Phase-Encoded, 800 bit/in. NRZI and 7-track NRZI (in the Aspen models only).

The units will be field-installable so present devices can be upgraded and will be "present library-compatible."

By accelerating the Kiowa

family of announcements, IBM estimated it could add revenues of \$500,000 in 1973, \$1.1 million in 1974, \$1.4 million in 1975 and \$1.6 million in 1976.

At the same time the task group recommended accelerating IBM Commanche development programs, the programs leading to completely automated tape libraries.

Two Better Than One

The original product in this line was to be Commanche I, for large installations, but the planners recommended accelerating the Commanche II which would be a "low-cost automated tape library."

With this unit the drive could be used as a stand-alone device, and since it would be compatible with the earlier unit, it would "accelerate conversion to Commanche," the planners said.

This speedup would add \$700,000 to revenues in 1974, \$2.4 million the next year, and \$5.6 million the year after, above the amount predicted by the IBM seven-year plan covering the 1970 to 1976 period.

(All the above figures are estimated in IBM "points" in the documents, but IBM in other documents has defined a point as a revenue dollar per month.)

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Leather and Leather Products
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Railroad Transportation
Local and Suburban Transportation
Motor Freight Transportation and Warehousing
Water Transportation
Air Transportation
Pipe Line Transportation
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Communication
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Retail Trade—General Merchandise
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The Plan: Enlarge Product Line, Protect Installed Base

TULSA, Okla. — If the IBM planners saw a potentially serious situation in the tape market, there was even more serious competition on the disk side. By 1976, the planners predicted the plug-compatible manufacturers would account for 16% of the 2311, 2314, 3330 and Winchester-type disk units in the field. But even more significant, in the important lease

market area of the field inventory, the planners estimated the independents would control 30% of that segment by the same date.

'More, More, More'

The very large growth in the market for direct access storage devices itself would assure the acceptance of the independents, the planners said, and they determined that a "product development strategy" was the "best answer" since "accelerated product development enhances IBM acceptances."

The planned strategy in 1970, therefore, was to enlarge the product line and at the same time protect the installed inventory of equipment at user sites.

The plan shown at that time was to take 2311 users to a new product called the "Colt" in the 1974 time frame or to Winchester or to the 2314. The 2314 users were expected to go to the 3330 or through "IBM Leos" to the Winchester.

The 3330 users were expected to upgrade to an "Iceberg" device in 1974 and then move to Apollo in 1976 or to "Weatherby" in the same period.

The Iceberg unit described in the papers is thought to be the increased capacity 3330 since it was scheduled for the first half of 1973 and a "desirable" feature included a new disk pack and servo modifications.

The enhancements to the "Winchester" disk were to be the Colt line. Colt itself is expected to be announced any day with a 15 M/B (Mbyte?) cartridge, but a 45 to 60 M/B cartridge will be unveiled later.

There will also be fixed head options with the device and the latency time will be reduced as product enhancements are announced over six-month periods, the IBM documents showed.

The Weatherby unit will replace the 3330 and will have 250 track/in., and 6,000- to 8,000 bit/in., and 100 to 200 MB/pack. It will be one-half to two-thirds of the Merlin or 3330 cost and will be announced in the first quarter of 1975 if not accelerated.

The "Mallard" program on the drawing board in 1970 has already reached fruition in the 2319 drive.

In this program, the firm, according to the documents, just removed one drive from the 2313 four-drive box and added a native attachment adapter board so it could hook up with integrated controllers in certain 370 models.

After playing around with different prices, it was apparently decided to go with the middle price in the range which gave the device a price tag of \$333/drive.

3330 Maintenance Pricing Differed

TULSA, Okla. — Previously secret IBM documents indicated that the firm, in certain instances, agreed to take greater than normal profits on some maintenance agreements.

On the 3330 controller, the 3830, for example, the firm took a normal profit level, charging \$170 with the costs set at \$166.19 for services. This, the firm said, was a "normal" profit.

On the 3330, however, the firm announced the monthly maintenance at \$200, even though the costs were only \$177.57 and the "normal" profit level would have been \$180.

The document does not explain the reasons for the discrepancy, but noted it was "agreed to announce a greater than normal profit at \$200/mo."

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TWENTY YEARS

from date of shipment from Graham, Texas. Graham Magnetix further warrants that its Epoch 4 magnetic tape conforms to and meets or exceeds the magnetic and electrical specifications for the standard reference provided by the computer manufacturer.

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(1) **DEFECTIVE TAPE** A defective magnetic tape is one (other than damaged tape) which does not meet the Graham Magnetix specification in effect on the date of original sale.

(2) **DAMAGED TAPE** There will be no replacement of tape damaged due to either (a) improper handling by user personnel, (b) machine damage, or (c) User nonconformance with humidity, temperature, or other storage and operating standards set forth in the Graham Magnetix specifications.

In the event that the User determines that a manufacturing defect exists during this warranty period, he shall report to Graham Magnetix the nature of the manufacturing defect. Graham Magnetix will investigate and, if necessary, retest such tape promptly. If it is determined by Graham Magnetix that a manufacturing defect exists, Graham Magnetix will replace the tape, tape for tape, on an exchange basis and assume transportation charges (both ways) necessitated by such replacement.

If Graham Magnetix determines that the tape has no manufacturing defect or has been damaged by the User, or his equipment, the tape will be returned to the User and the User will assume the transportation charges (both ways).

The remedies for breach of warranty set forth herein are the sole and exclusive remedies of the User, and in no event shall Graham Magnetix be liable to the User for damages of any kind other than specified herein. The warranty expressed herein is in lieu of all other warranties, expressed or implied, and no other affirmation of fact or promise made by word or action shall constitute a warranty. This warranty shall terminate with respect to each reel of Epoch 4 tape twenty years and one day from date of shipment from Graham, Texas.



GRAHAM MAGNETICS INCORPORATED
Graham, Texas 76046 WATS Phone 800-433-2701

IBM Had Problems Pricing 3211 Printer

TULSA, Okla. — How does IBM price a product?

A look at the 3211 printer gives an insight.

The IBM planners noted the 3211 consisted of several different boxes but could be sold only as a system. They decided to price each part of the subsystem separately to "achieve satisfactory profit."

Another way to maximize profits was to rebuild used units as they became available from the field, the suit documents showed. In the case of the 3211 it was determined it would cost the company only 35% of the original manufacturing cost to rebuild a unit, thus increasing the profits on the "rebuilt" rented to customers for the same prices as the new units.

Solving a Problem

IBM had a problem pricing the 3216 print train for the 3211,

the documents revealed.

"For a 40-pound piece of metal, the 3216 is an extremely

How to Price a Product

precise and expensive item," the research said.

"The very fine tolerance requirements and high maintenance costs made it difficult to

'New Technology' Printer Planned

TULSA, Okla. — When IBM originally introduced the 3211 2,000 line/min printer, it expected to have a 1,600 line/min follow-on unit with OCR capability code named the "Altair" soon on the market.

The Altair device was to be identical to the 3211 except for a change in the printer hammer drive cards in the 3211 con-

price at a profit. Yet the 3211 would not function unless a 3216 was mounted in it.

"This begs the question: Why not bury the cartridge in the price of the printer and avoid the financial and marketing problems of renting it at \$350/mo?"

"The decision to announce it as a separate type was based on inventory control reasons. Since the customer can physically re-

Printer Planned

troller. That would give it the 1,600 line/min speed. Essentially it was to be a slowed-down 3211 at a cost reduction.

But neither this product nor a planned upgrade of the 1403N1 printer (called the 1403N2), with a capacity of 1,050 line/min, was the most exciting product the IBM engineers were working on.

The Jubilee printer was.

This device, to quote the documents, would be "a 10,000 line/min non-impact printer, named Jubilee, representing a completely new technology."

Early Bird

This device is — or was in 1970 — in the early development stages, so the market planners could not outline its features in any detail.

The documents also showed that IBM was working on a replacement for the 2540 card reader punch, to be called the "Redlake/Pikelake" system.

move the cartridge from his printer and insert other 3216s, it was felt that serial numbers were necessary to keep tabs on the whereabouts of the inventory and protect against violations of IBM policy (such as lease of purchase).

"The \$350 price of the 3216 wasn't high enough to return but minimal profit and yet seemed outlandishly high in comparison to the \$97 charged for the 1416 cartridge mounted in the 1403N1. Pricing recommended a price increase on the 1416 to restore some balance to the 3216 price comparison and put the 1416 on profitable footing. But the decision was deferred."

Overall, the 3211 program, according to the IBM documents, was "intended to retain IBM's leadership position in printers

The Documents...

The source documents used in writing these stories as identified in the Federal District Court for Oklahoma are listed as: Plaintiff (Telex) exhibits 12a, 52, 89, 121, 122, 140, 152 and 162. They are among the 664 exhibits offered as evidence by Telex at this time.

Most of the documents are internal IBM documents supplied to Telex by IBM during the discovery process. IBM had tried to prevent the introduction of almost all of the internal IBM documents into the case, but was only allowed to keep 10 of the documents out of the public record.

until a newer, non-impact concept can be introduced."

"Financially, the 3211 program should be a profitable one," they said.

Framingham Picks Honeywell 2020

FRAMINGHAM, Mass. — The Keefe Vocational Technical High School Committee has voted to lease a Honeywell 2020 computer for use in its data processing program after several months of committee conflicts over the computer selection [CW, Jan. 17].

The Honeywell unit and related equipment will be leased for three years at \$4,729/mo including maintenance. This represents a savings of \$2,346/mo over the original figure budgeted for this expense, officials said.

In comparing various systems, the school committee had narrowed its choice to two ven-

dors — IBM and Honeywell. While some committee members felt the IBM unit would have been a better choice because it is more widely used, it apparently would have cost an additional \$2,000/mo.

Chris Cassidy, Keefe computer program coordinator, recommended the Honeywell 2020 because Honeywell will supply curriculum materials and staff education, as well as support for student scheduling, payroll and attendance, all at no cost. The firm also will allow cancellation of the lease, should funds not be appropriated on a yearly basis by the town.

Or is it
Epoch 4
that makes
our 20-year
guarantee
so good?



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Editorials

Informing the Public

Computerworld congratulates Judge A. Sherman Christensen, who is presiding over the IBM-Telex trial, for allowing certain IBM documents to become public knowledge.

In the long term both the computer industry and the computer user will benefit from knowing the results of these internal decisions which affect the way the computer community does business and pays for its computer systems.

The Computer Industry Association should also get a hand for its persistence in asking the various courts now hearing IBM cases to make the public aware of the contents of various documents.

We do not pretend that the judge was influenced by the association, but only that its efforts to try to ensure full and fair disclosure of non-trade secret IBM-information are valuable to the computer community.

This community can not — and should not — stand for another incident like the IBM and Control Data settlement where an important index was destroyed. Full disclosure of the documents can prevent a similar recurrence.

Only an informed public can keep pressure on the Justice Department and the White House to make sure that the government's suit is seen through to the rightful conclusion and that no deals are made before it is heard in court.

New Penalties Needed

An honor code for employees in data centers which handle sensitive governmental information is a good idea, but the one used as an example by the Government Management Information Sciences Users' Group in a soon-to-be-released report is only a partial answer.

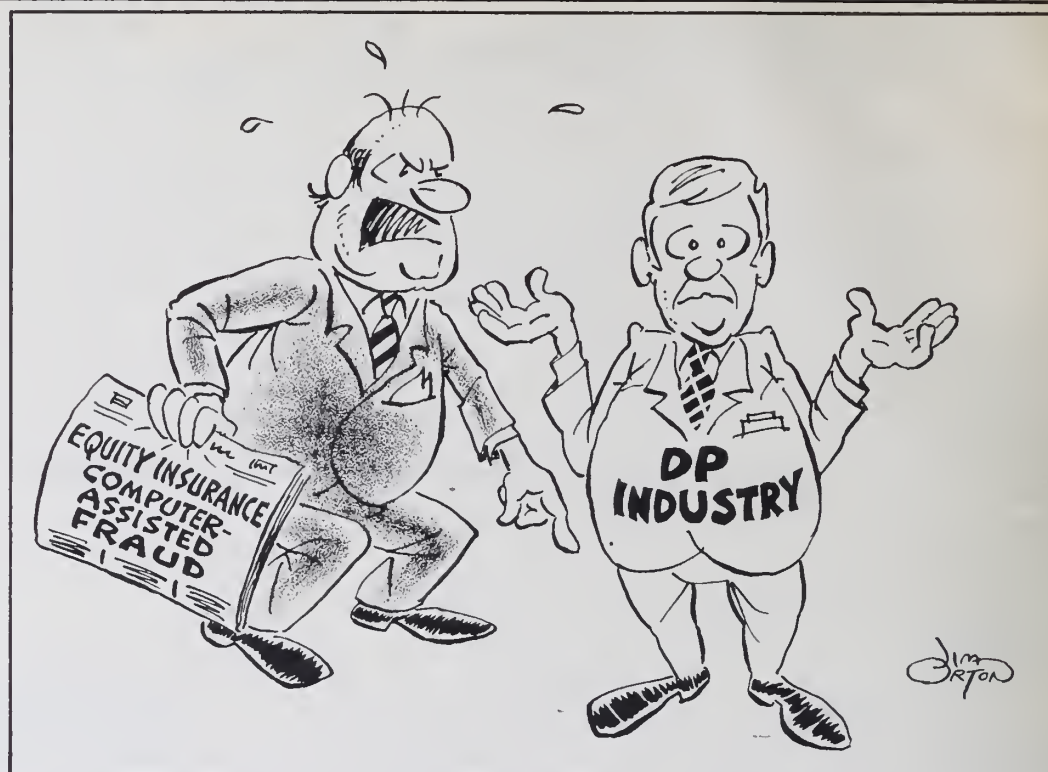
The rules and regulations on how an employee is expected to handle confidential data are generally good and fairly wide-ranging, but violations of the code do not contain any major new penalties.

Any violation of such regulations is becoming an increasingly serious business as more and more personal information is filed in computerized data banks.

In developing a code of conduct for personnel handling such records, local governmental units should not rely on the present civil service codes as a guide for penalties.

Privacy and security of personal records are too important to be allowed to fall under civil service jurisdiction, which is often slow and outmoded — and which in more cases than not serves to protect dishonest civil servants rather than the general public.

The governmental agencies should set up a new set of stiff penalties for any infraction of such rules, with possible mandatory jail terms for violators.



'...And If the Programs Weren't Rigged, You Should Have Written Them to Catch the Crooks!'

Letters to the Editor

Programmers Wanted Who Code Smart

Undoubtedly there are applications that code faster in RPG than in Cobol. The same applications will probably code even faster in a commercial report writer and file manager package.

There are good reasons why Cobol is the most popular programming language for commercial applications, but speed in coding a program from scratch certainly isn't one of them.

Any programming language represents a compromise between various characteristics, including machine efficiency, maintainability, range of available features and so on. For those who never get beyond sort and tab, RPG is first rate.

Unfortunately the RPG shop will have trouble getting beyond sort and tab. The logic of RPG resembles a 407 more than a 370 so that RPG programmers will have difficulty in understanding (and utilizing) the advanced capabilities of modern computing systems.

More to the point, the ordinary programmer raised on RPG won't even have the conceptual knowledge of such features as segmentation, subroutine calls, subscripting and message analysis needed to conceive such an application.

If we are to make intelligent use of the power of the computer we need programmers who code smart rather than programmers who code fast. RPG is interesting, unique and within a limited range of applications quick to code. As a programming language it represents a dead-end street.

The number of more sophisticated customers who remain underwhelmed by RPG describes the language's limitations better than I can.

John Culleton Jr.
Sykesville, Md.

Adequate Means To Compare Needed

Re: "RPG Produces Profits," April 11 Letter to the Editor by John R. Thomas Jr.

Advice which ignores such im-

portant factors as program maintenance, relative execution times and total executions expected during a program's useful life could quickly lead to a "penny-wise, pound-foolish" operation.

Checking programmers' and analysts' work for profitability is reasonable if the checker is given adequate means of comparison and rating.

Lack of comprehensive, objective means of comparison and rating is a significant barrier to professionalism in data processing and we only compound the situation by ignoring some of the factors which we already recognize as important.

Daniel P. Reeves
Yucaipa, Calif.

The Name Game... Consult a Librarian

The recent series of letters relating to Robert M. D'Unger's difficulties in getting his name used properly by computer systems [CW, April 21] prompts me to mention a considerable body of experience regarding this problem with which most of the letter writers are apparently unfamiliar.

Those of us engaged in "bibliographic data processing," having files on the order of half a million names or so, have had to deal with this problem strictly from the user's point of view. Bibliographies, catalogs and indexes for the library profession must be arranged in sequences meaningful to the user.

Hence, sorting methods must be developed, for example, to sort the surname St. Claire as though spelled out — Saint Claire; to sort McNerny as MacNerny; etc.

In addition, it is necessary to ignore some elements such as articles and prepositions in all of several languages. One does not want *Das Kapital* to file in the D's.

There has been a number of programs developed to sequence names and titles in meaningful order.

Most depend on the construction of a dummy field in which a sort key is constructed by applying the appropriate conversion algorithms to the original

fields. The file is then sorted on the dummy field, but only the original field is printed.

One problem ignored in this area so far, because of the size of the conversion algorithm, is the filing rule that titles beginning with a number are to be filed as though the number were spelled out, in the language of the text; i.e., *3 Short Stories* sorts in the T's while *3 (Drei) Novellen* sorts in the D's.

In short, if one is seriously interested in the accurate processing of proper names, one should consult a librarian who has some experience in computer systems.

Allan D. Pratt
Assistant Professor
Indiana University
Graduate Library School
Bloomington, Ind.

IBM Findeth a Way Out

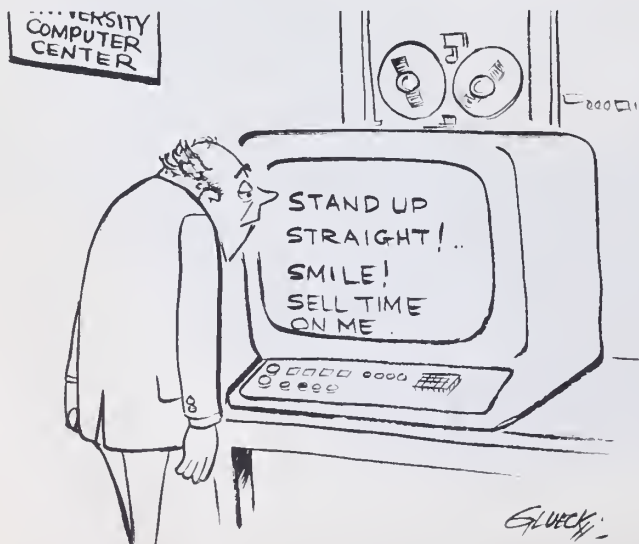
James P. Fraser's "Last Word on IBM and Individuality" [CW, April 11] prompted me to write the following:

IBM is my standard,
I shall not lie awake nights,
It leadeth me through the
jungle of the computing
world
And helpeth me to avoid bobbles.
Yea, though I agonize over
lower cost equipment
I shall not be screwed
For GEs and RCAs do trouble me
And insecurity rotteth my
soul.
While IBM doth betimes lead
me to rocky ground,
It findeth a way out and com-
forts me,
I shall cleave to my standard
forever
And get on with the bloody
job.

L.B. Moore,
Director
Computing Centre
Ryerson Polytechnic Institute
Ontario, Canada

(other letters, viewpoints on
Pages 11, 14 and 16)

Computerworld welcomes
comments from its readers.
Preference will be given to
letters of 150 words or less.



Anticipate 'Wrong' Places

How Do We Find 'Right' Place for D'Unger's Name?

During the past few weeks *Computerworld* has received a number of letters about the case of Robert D'Unger. As most readers by now know, D'Unger found that computers do not treat his name properly and consequently his accounts get confused. As readers also know, the grass roots computer professionals feel D'Unger's name should not be confused, but they don't agree on exactly what should be done to correct the problem.

The problem is where to put D'Unger in various collating sequences. Many different and logically good suggestions have been made to put him in one place or another. Others have argued that it does not really matter where he is put, as long as it is always in the same place. Sooner or later, they say, the outside world will catch up with computers, and then will automatically bow down to accepting whatever the computer has decided.

Saving Computer Time?

Sometimes the existence of outside standards — such as those used by librarians — have been acknowledged, but in general have been dismissed as not worthy for serious consideration. After all, the important thing is to save computer processing time, isn't it?

From what I have seen of the usage of central computer time, and from what I know of the frequency of people with problem names like D'Unger, I just do not buy this argument. Little central processor time need be used to stop the confusion. It is programming, not processor time that has been saved.

I suggest we need an alternative goal. I suggest we put D'Unger in the *right* place, rather than in the computer's most *convenient* place. By "right" I mean whatever will maximize the efficiency of the function which involves putting D'Unger on a list in the first place.

I do not really believe in the divine right of computer collating sequences to define correctness. I believe data processors

should see that the user job is done correctly, rather than conforming the job to some idiosyncrasies of computerized thinking.

What Is 'Right' Place?

All of which leads to the problem as to just what is the "right" place.

For in-house systems, such as those which exist entirely within government agencies or firms, one definite place is as good as any other. Moreover, in view of the investment in the systems' current methods I suspect the correct place for such closed systems is wherever it happens to be at the moment.

For open systems, which impact sections of the public, other functions have to be taken into account. In particular there are two functions — obtaining fast access without retraining people or asking them to change their look-up habits; and minimizing errors.

"Indeed, it may be that computer people have been ignoring the possibility that there is no right position in general. To solve matters for D'Unger, data processors must take the more sophisticated approach of searching for ways of achieving the right result instead of looking for a nonexistent right position."

To achieve such a goal, I would give the task of putting D'Unger's name into a list to 20 secretaries, 20 office boys and 20 housewives picked at random, without any of them seeing what the others do.

At the end of this exercise we would have a number of reasonable positions for D'Unger's name within the alphabet, with probably three or four positions predominating. This would provide valuable information, including where to put D'Unger's name so it could be found quickly.

Doing it in this way, however, we would also obtain a list of the other places where people would look for the name D'Unger. To be precise, they would have listed the possible error positions.

Once the error positions are known it is quite simple to put up flags pointing out where the action should go. A very typical and generally useful system of this nature is in the telephone directories, with phrases like "MC-see also MAC."

Telephone people have worked on this problem for years. They, of course, have a vested interest in *solving* the problem

(rather than winning theoretical arguments). The telephone people want us to use the telephone directories, instead of calling information.

Ma Bell researches these matters carefully and knows these signposts are working. They know that people are particularly careful about the spelling of their own names, but don't have the same cautiousness about spelling other individuals' names.

One objection to this approach might be that if you took the sample of how people look up "D'Unger" in the middle of New York, you would probably get a different set of responses to the same question in, say, Quebec or Paris.

Indeed, it may be that computer people have been ignoring the possibility that there is no right position in general. To solve matters, DP must take the more sophisticated approach of searching for the right result.

As stated before, telephone companies have been successfully lifting much of the load from their information services by providing signposts in likely wrong positions.

Why then can't computers simulate such a simple system? It is obvious from the letters that have come in about D'Unger that the moment his name crops up in a North American file, there is a high probability that a computerized transaction is

going to be mismatched at some stage. It is also easy to see what the likely "wrong" character strings are going to be.

Why then can we not have redirecting entries put into the file to avoid such forecastable mistakes? Must we really continue to try to train the world to do things in exactly our way, instead of us organizing our work so the result comes out right?

So this is my suggestion for Robert D'Unger and others with problem names. I suggest that D'Unger make a list of the 12 or so variations upon his name that he has found computers use. Then he should duplicate the list, and send it to each of the people he does business with, and ask them to include in their records entries under these various versions, redirecting any transaction that comes in to whichever one they happen to like — provided it is spelled reasonably.

While he is doing it, he could send the concept to the SCDP Cobol Coordinating Committee, which is currently in the midst of trying to decide what to do with its collating sequences. I think having a *functional* collating sequence, which allows names to work properly, would make an excellent Cobol standard. And an unprecedented one at that.

Wouldn't it be nice to have a standard for doing things right for a change, instead of just doing them in some uniform manner which is "nearly" right?

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CDP Exam Tests for Knowledge, Not Ability to Act Professionally

By Susan H. Lewis

Special to Computerworld

As I understand it, the CDP exam tests for the existence of a reasonably well-defined body of knowledge thought to be necessary for a professional data processor.

Since the bar exam, the medical and engineering certification exams, the CPA and actuarial exams all follow this pattern I do not really see the cause of the

"An exam can only test whether an examinee has the minimum qualifications of professionalism: knowledge in the field."

current debate. Nor do I understand what would constitute "verification" of the exam.

The CDP exam is not like the PAT, which is an estimate of aptitude or a predictor of probably future performance. It certifies that CDP holders actually *know* something, know specific things they ought to know to be professional.

No exam can test if someone is professional; that is for the ethics committees of the professional organizations. An exam can only test whether an examinee has the minimum qualifications of professionalism: knowledge of the field.

No medical exam tests doctors for patient empathy, no bar exam tests lawyers for ability to preserve client confidences, though these things are clearly required in practice. A certification exam is a statement by a professional society of what its minimum knowledge requirements are. It does not predict success in the field and it does not attempt to discover the examinee's ability or desire to behave in the ethical manner considered professional.

I am currently studying for the CDP

exam and it seems to be a reasonable statement of the knowledge a professional DPer should have. I am not at all sure that an exam which correctly predicted "success" would do much to promote professionalism. There are too many successful "unprofessional" tactics for making money.

Also, this takes the decision of what a DPer should be out of the hands of the DPer and puts it in the marketplace. The reason other professions are considered "professional" is that they do not allow the marketplace to rule their notion of what they are.

True professionals decide that they will

Viewpoint

be something in addition to what the market demands in the short term — doctors must know medicine as well as having a good bedside manner, lawyers must know law as well as keeping clients' confidences.

Of course, in the long term the marketplace also wants professionals to know their profession, but success is usually determined in the short term. As professionals, we look to the long term, though our current salaries are paid in the short term, and decide that we will cultivate the expertise to make good decisions and the ethics to resist other considerations which would influence us to make bad ones. Clearly, the first requirement is knowledge. Without that, there is no way to act either responsibly or irresponsibly.

Knowledge is what the CDP is about and what it should be about. If we are going to debate on the CDP exam we should focus on the relevance of the knowledge the exam requires.

Susan Lewis is a systems analyst for Arthur D. Little, Inc., Cambridge, Mass.

Readers Respond

The March 7 Taylor Report, "Misforwarded Letter Sets Off Billing Controversy," was about a Massachusetts woman, Marilyn Evans, who received a bill incorrectly addressed to her. When she returned it to the sender, Singer Sewing Machines, she sparked a series of inappropriate dunning letters.

The following responses from two readers indicate the responsibility for solving this sort of problem rests with the data processing profession, but that the profession may be shirking its responsibility.

Writing to the President May Get Desired Result

I read the Taylor Report article, "Misforwarded Letter Sets Off Billing Controversy," and I see Singer Sewing Machines, Inc. has not changed. I experienced a similar problem over three years ago but I was more fortunate. After the usual no response from Singer, I looked up the name and business address of the president and wrote to him. This cleared the matter up in no time.

I would suggest such a technique to Marilyn Evans. But the problem is not hers; it is, as you stated, ours and our profession. — Ballinger B. Moore Jr., Dallas, Texas

It's a Wonderful World Of Credit and Computers

Re: "Misforwarded Letter Sets Off Billing Controversy," you said Marilyn Evans "does not think that the fact that no L. Evans is at the address will stop the credit rating computers."

The October 1972 issue of *Retail Control* published by the Financial Executives Division of the National Retail Merchants Association contained the following statement from an article by a representative of TRW:

"Generally, the problems involve a failure to report correctly, disputed transactions or previously delinquent or problem accounts that have been paid. Along with the problem of initially receiving information which is not accurate, agencies are faced with the additional problem of getting prompt responses when they attempt to verify data. Our basic philosophy is that the information supplied by retailers is correct until such time that the retailer informs TRW to make a change."

There you have the wonderful world of collection, credit bureaus and dunning — brought to you by a company deeply involved in developing the "science" of computers. — Robert Kahn, Lafayette, Calif.

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GENERAL AUTOMATION 18/30 DMS

See DMS in Booth 2201 at the National Computer Conference.

The Professional's Viewpoint

More Description Needed in Descriptive Billing Uses

Joseph T. Rigo, New York ACM ombudsman, recently compiled a report on descriptive billing practices, including recommendations for future action.

The following extracts from the report detail his conclusions.

By Joseph T. Rigo

Special to Computerworld

An ACM NYC Chapter member last fall received a monthly bill from a credit card company including a \$15 charge identified only as "FL MT LAMONT," and a \$40 charge as "RETAIL PURCHASE."

On inquiry, signed receipts were obtained, and FL MT LAMONT turned out to be the Florence Motel in Missoula, Mont., where the ACMer had stayed one night on vacation three months earlier. The bill was paid.

However, the question of whether the

bill, although accurate, was adequate remained, particularly since the dates next to each charge had no connection with the date of purchase.

Trend of the Future?

The bill was handled by the technique known as "descriptive billing" where signed receipts are not returned with the bill. It is known that many firms in many industries are anxious to move into this form of billing, getting away from having to return receipts with bills (country club billing).

Descriptive billing was considered a valid matter for ombudsman inquiry since it seems likely to be a potential source of complaints against computers and computer professionals. People who get bills they can't understand will tend to blame the computer.

The following conclusions and findings come from the initial inquiry into de-

scriptive billing:

- A descriptive bill should be sufficiently detailed so that the person receiving it knows what he or she is being billed for.

- It may be reasonable, but it is not realistic, to expect consumers to keep their copies of their signed receipts so they can be matched against their monthly bills when they arrive.

- If charges are dated, the date should be the date of purchase. It does not help the customer's memory to know what date his charge entered the credit card firm's computer system. In fact, this is a source of confusion.

- More identification is required for small or routine purchases than for major or unique expenses (such as air flights or hotel stays).

- Mere firm identification is not enough, even when the date of the purchase is given. If a firm description is

added, e.g., "Jones & Co., Florist," specific details of the purchase may not be necessary.

- Present technology may not support further development of descriptive billing at this time. It is currently prohibitively expensive for a credit card company to specify exactly what was purchased at a large department store.

Given improvements in optical character reading, it may soon be possible to narrow the gap somewhat.

- Billing firms must provide adequate information to support tax and business requirements. Internal Revenue regulations require that purchases be specifically identified. Firm names are not enough.

- Credit card firms generally allow customers 25 days to pay a bill before finance charges are applied. If a customer must send for receipts to verify a purchase and the legitimacy of a charge, this should be considered in determining the length of the grace period.



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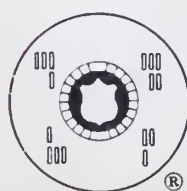
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Letters to the Editor

Lack of Trained DPer: Is It Myth or Reality?

Re: the April 11 front page story on trained DP personnel.

Formal college training may provide in the future a fair labor market from which industry can draw, but many colleges can't afford a sophisticated enough program to equal what industry expects and demands.

For years, institutions of higher learning have been pleading poverty for budget dollars just to run their schools, due to steadily rising administrative costs, so how can they justify a large-scale computer operation?

Second-generation computers and experience do not particularly appeal to employers or smart students these days. On the other hand, many colleges are fortunate enough to be able to afford hardware configurations equal to those found in industry, but employers are still reluctant to hire the new graduate as an experienced programmer, without first putting him through their own rigorous training program. Reviewing this in retrospect, what good, if any, did the college programming course do?

Another significant factor is that during the recent business recession industry did very little if any hiring in the category we'll call programmer trainees.

So consequently when one examines the help wanted sections of any of today's major city newspapers, there are a significant number of opportunities for qualified programmers and analysts who have had one to five years of experience. If there wasn't the shortage, as Afips claimed, maybe that organization has an answer to the statement made by the Advertising Council that the lineage of help wanted advertising for data processing personnel is practically back at the highest level attained during the late 1960s.

The crunch for qualified DP personnel in such areas as real-time teleprocessing, communications networks, data base design, report generation techniques, software development and virtual memory is more evident today than it ever has been before.

Corporations seek and demand people with specific skills in their own industry, i.e., banking, insurance, etc., and these trained individuals are just not available.

Steven R. Weber

Hartford, Conn.

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Contact Between PLC, User Lacking

By Christopher Coddington
Special to Computerworld

Fred L. Forman's "Viewpoint" [Make "Suggestion Direct to PLC," CW, April 11] strikes me as a carefully contrived attempt at discrediting Alan Taylor by ignoring the basic problem.

Like Forman, I do not agree with putting another committee between the user and PLC — but then I do not think, as Forman apparently does, that Taylor ever intended such an insertion.

What he is suggesting is a medium for making public the proposals to PLC, and for making known the desires of the Cobol community. Providing this medium is the basic problem that I see, and that Forman ignores.

Viewpoint

PLC proposals need to be made public at the time they are initially distributed to PLC members. PLC, having no financial backing, cannot provide such a service. Lack of funding, therefore, prevents PLC from being able to notify the user community of pending actions. Taylor is offering a self-supporting method. So much for that basic area.

At the same time I cannot pass over the somewhat irrelevant Forman defenses of PLC against charges of secrecy and lack of user involvement.

Forman's pointing to the *Journal of Development* and the minutes to prove lack of secrecy is absurd. These are both after-the-fact documents, as far as the details of what is contemplated are concerned.

Forman's labeling of 45% of the proposals considered as "non-PLC" is, in my opinion, a corruption of statistics to support a point of view. The figures do not defend PLC from the secrecy charge, but might show just how much (or how little) PLC is in contact with the user.

	Jan.-Oct. 1972	Jan.-Feb. 1973
PLC-member proposals	90	26
PLC-affiliated organizations:		
Ansi	26	12
Ecma	11	1
PLC-Task Groups	10	2
Japan	1	—
Share	—	2
Non-PLC organizations	4	4
The Actual Non-PLC Organization Number	4 out of 138 or 3%	4 out of 47 or 9%

Figure 1. The proposals considered by PLC in two recent periods analyzed by their source connection with PLC. (Source: October 1972 and February 1973 PLC Minutes)

After analyzing the details in the minutes of two recent PLC meetings (Figure 1), I find that under 10% of the proposals considered were from really non-PLC sources as against Forman's claimed 45%.

The reason for the difference between my figures and the ones given by Forman is that I exclude from the "non-PLC" category proposals made by PLC members who have since resigned, proposals from PLC-affiliated organizations and comments addressed to PLC task groups that are not valid PLC proposals.

Regretfully, I must note that the results do indicate a lack of real contact between PLC and the user.

Methinks Forman protested too much. Rather than being so defensive of PLC, Forman would do well to work toward more involvement of the Cobol community.

Coddington is a former member of PLC.

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Letters to the Editor

The Name Game

I submit that Robert M. D'Unger's problem [CW, March 21] is not his apostrophe but his vanity. I know whereof I speak because I have had a similar problem. The solution is to be flexible. Although I normally sign my last name with a space and two capital letters, when I fill in my name on data forms I omit the space and use all caps.

Robert La Fara
Robert Lafara
Robert LAFARA
Indianapolis, Ind.

Hidden Factors

I would like to continue the discussion started by Marvin S. Ruth [Letters to the Editor, CW, March 28] regarding programming languages, and continued in the April 11 issue by John R. Thomas.

It should always be remembered that cost of programming must always be considered, but this consideration must not only

contemplate the hours of programming coding time. Other factors that must be considered are: computer time used in compiling, memory size of the compiled program, operating efficiency of object program and ease of maintenance and modification.

Marvin Blumenfeld
New York, N.Y.

Women's Rights, Now

I would like to call attention to the editorial cartoon in the April 11 issue of *Computerworld*. In view of CW's concern for the rights of individuals with past criminal records it might also take into account women's rights.

The cartoon admittedly is not glaring in its discrimination, but is rather an example of the more insidious form of prejudice.

It is true that "nosey-bodies" can be of either sex; however, I must call into question the use of men for the professional characters and the women for the

personality-traits. If CW's editorial position is one of people's rights, please let it extend this to all people.

Susan Wachtel
New York, N.Y.

Salem Does It Twice!

The article on Page 3 of the March 21 issue on Salem's selection of hardware clearly illustrates not only ambitious salesmen, but stupidity on the part of the government or council.

I would bet my last dollar the city had no formal plan, no time-table established, no description of the applications to be run, etc. Let's face it — it costs money to install computers — and small firms and local governments do not have the expertise (generally) to isolate these prior to making a commitment. It's clearly a poor business decision — and Salem rectified it by doing it twice!

T.J. Decker
Fort Lauderdale, Fla.

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Random Notes

Nova Users Gain Mag Tape, Cassette Support With SOS

SOUTHBORO, Mass. — The Stand-Alone Operating System (SOS) has been enhanced by Data General Corp. to allow Nova users to store and retrieve data and programs from 9-channel magnetic tape units and Nova Cassettes. Previously the only media supported by SOS were paper tape or punched cards.

SOS was created for Nova users who do not need a disk-based operating system. The new additions mean a user can store, edit, assemble and do relocatable loading of programs under SOS without being tied to relatively slow-speed paper tape. Programs written under Data General's Real-Time Disk Operating System (RDOS) can run under SOS.

Security Data Bases, Portfolio Management All Part of 'Fiss'

PARAMUS, N.J. — Users in the investment community can access fundamental and technical data bases on securities, and account for and evaluate securities in the portfolios under their management, through the newly inaugurated Financial Information System Services (Fiss) on the ITT Data Services network.

Fiss includes the Start financial system of stock exchange data bases, and the "financial language" needed to access the Start data files. The Asset portfolio accounting system and the Bid Municipal Bond Management System are also part of the overall Fiss operation.

ITT Data Services is at P.O. Box 402, 07652.

Sabretalk Trimmed by 100K

MIAMI — A new version of Sabretalk, the high-level language used in conjunction with the Airline Control Program (ACP) compiler, has been released by American and Eastern Airlines, which developed it jointly. The enhanced version requires only 140K bytes of core, the airlines said.

Although ACP was originally developed for use in the airline reservation field, it has been adapted by other users to serve financial companies, a metropolitan police department and a large car rental company.

The new Sabretalk may be purchased for \$95,000, but lease plans are available. Eastern's Computer Science Division is at Miami International Airport, 33148.

Correction

Output from the Plotter option of Boole & Babbage's Configuration Utilization Evaluator (CUE) package [CW, April 18], is produced directly on a line printer along with the more conventional tabular-style CUE reports. Special plotting equipment is not required, a company spokesman emphasized.

Purchases Can Hurt Morale

Source Code Must Accompany Packages

By Don Leavitt
Of the CW Staff

CHICAGO — Bringing a software package into an installation from an outside source can have some psychological impact on the user's programming staff, but good management should be able to minimize an undesired effect, all three speakers on the software evaluation panel agreed at a Computer Caravan/73 session here.

They also agreed that availability of source code, during the evaluation period, after the software is purchased or leased, is an absolute essential.

Review of source code is one way to determine how efficient the programming is during evaluation, and availability of the code after the system has been brought in is vital to proper maintenance, they said.

Even though all three had acquired soft-

ware outside, they differed sharply on whether outside vendors should be considered "as a matter of course" whenever any new project was being contemplated.

Both Jack Driscoll of International Harvester Co. and Paul Weininger of Washington National Insurance Co. said they considered outside sources as natural extensions of their in-house staff capabilities.

Howard Gielow of Alberto Culver Co. disagreed, explaining that "no one has exactly what you want; the in-house staff should be capable of building any applications you need; and they need the self-assurance that management looks to them first."

Evaluation Procedures

While they were generally inclined towards considering outside sources, both Driscoll and Weininger had developed

fairly hard-nosed evaluation methods.

Driscoll said he follows several steps.

Triggered by a request for a new application, he attempts first to determine both the actual immediate needs and the possible future extensions of the proposed system. He then estimates the in-house costs of developing the system and its potential life-cycle.

Only then does he begin to make a survey of the available packages. "Unless I know how much my in-house costs might be," he explained, "I have no means of knowing whether proposed package costs are reasonable."

Weininger had developed a more elaborate evaluation structure at Washington National, but it also starts with an evaluation of whether the in-house staff can do the job, at what cost and in what time-frame. If those parameters are acceptable to the requesting department, the work is done in-house.

Otherwise Weininger prepares a request for proposal which he sends to all software houses that appear to have products appropriate to his needs. In his solicitation, Weininger requires all potential vendors to tell him specifically how their packages will meet his needs.

The various proposed packages are posted to a "payoff matrix," which Weininger admits is a very personal procedure, but it does provide an orderly way of assigning weights to various elements in a desired system.

Only after all the screening is done in-house are the remaining potential vendors allowed to make their presentations, Weininger said.

Multiple Data Lists Controlled In Single Disk Area With 'LMS'

CHICAGO — IBM 360 and 370 users can eliminate much of wasted space normally encountered with disk-based sequential or partitioned data sets by sharing a single disk extent area among many independent lists, all controlled by the List Management System (LMS) from Jefferson Financial System, Inc.

Part of LMS's efficiency lies in the fact that, unlike other chain-file techniques, it does not use logical record address pointers. Records are connected at the block level only, a Jefferson spokesman explained, and a single list requires a minimum of one data block but may be expanded to utilize any available space.

Application programs utilizing LMS can read, write, update, insert and delete records beginning at either end of a list, and can also direct changes in processing direction at any point.

The records within a given list must be fixed length, but the lengths may differ from list to list. Users may process an unlimited number of lists within a given program and LMS manages all buffering and deblocking. The system can control 10 buffer areas under one program but nothing within LMS prevents any of these buffers from being used by several different lists during the running of a single program, a Jefferson source noted.

Under LMS, users can connect lists into hierarchical structures such as trees; product structure files; outstanding order files; and other business-oriented relationships. This facility to link lists together logically makes LMS a "powerful tool for state-of-the-art data base design," he added.

LMS is available in both a DOS and an OS version and can be called from a Cobol, Fortran, PL/I or BAL "host pro-

gram."

The program structure enables LMS to execute in as little as 6K bytes of storage, exclusive of buffer space and user program "list tables"

The system is available under three pricing schemes: leases of \$500/mo, \$5,000/yr or outright purchase for \$20,000 including a maintenance agreement. All three policies include system documentation and availability of a free two-day seminar at Jefferson's office, 177 N. Franklin St., 60606.

CDC 3000 Series to Be Enhanced By MSOS 5 and Related Hardware

MINNEAPOLIS — Users of CDC 3000 medium-scale CPUs will be able to run four on-line jobs, batch processing and I/O operations simultaneously when a new multipartition mass storage operating system (MSOS 5) becomes available — for a price — early next year.

A handful of hardware modifications scheduled to be released and used with MSOS 5 will also increase the processing capabilities and the size of several of the CPUs in the series.

Availability of the separately priced MSOS 5 will not affect the availability and continuing development of the current, single partition MSOS 4, a CDC spokesman stressed. The new operating system is more powerful than many 3000 Series users need and there is no reason for them to shift to it from the free system, the company continued.

For those who do use it, MSOS 5 will provide faster interrupt responsiveness, expanded job control and reduced core requirements for the operating system itself. At the same time, a hardware change will allow memories on the 3100, 3150 and 3200 CPUs to be extended to 262K alphanumeric characters, or 65K words — twice the maximum size previously available.

Other hardware modifications that should be ready with MSOS 5 in the first quarter of 1974 include logic to handle ANS Cobol and to expand channel capabilities on the 3100 and 3150 systems.

Although the general policy of charging for the hardware and software facilities related to MSOS 5 has been acknowledged by the company, no specific prices have yet been announced.

For MMS General Ledger Users 1973 Will Be A Healthy Year.

Since January, 15 companies have ordered the MMS General Ledger System. Each one of these corporations is worth more than \$20 million (one is in the billion dollar class). They all have the programming staffs and resources necessary to develop their own corporate financial systems. But even the big companies don't have unlimited EDP budgets.

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Geared to Worker Reports

Package Aids Project Simulation, Control, Analysis

CHATSWORTH, Calif. — A generalized project planning and control system, Procon 3, includes a forecasting process that is simpler to use and more comprehensive than Pert, according to the developer, Craig & Nichols.

The system, which requires 100K bytes on a 360 or 370, also supports a simulation facility to test the effect of proposed changes, a two-way channel of communication between workers and managers, and project analyses in either bar chart or graph form.

The system starts with the entry of an experimental plan using just as much detail as the planner can provide. Through simulation he refines the plan, taking into account schedule, budget, cost and availability of personnel to work on the project.

Once the plan is formalized, it is used to prepare assignment sheets for each employee at the start of each reporting

period. These sheets outline specifically what portions of particular projects are to be done and how much time these efforts should require.

At the end of the reporting period, the employees report back to Procon 3 what they actually accomplished and how long it required. If actual progress fails to match projected progress, the type of work and hours assigned will be modified in the next round of assignment sheets to reflect the slippage.

A project analysis report serves as the project leader's basic planning and control tool. It generates a schedule and a budget for a proposed project, and aids in identifying problem areas and forecasting the impact of slippages on remaining segments of the project.

As part of its support for planning, Procon 3 includes a user-defined "dictionary" of resources available and costs.

This forms the first checkpoint on any proposed plan and the system immediately warns the user of any basic omissions in his specifications.

The system operates under either DOS or OS/360. It is currently available for

\$11,500 which includes source code, reasonable supplies of various manuals, five days of on-site guidance and one year's maintenance.

Craig & Nichols is at 20061 Hiawatha St., 91311.

BCS Creates Network to Link CTS and Mainstream Services

DOVER, N.J. — The BCS Network, recently implemented by Boeing Computer Services Inc., provides low- and medium-speed terminal users in 15 metropolitan areas local phone connection to either Conversational Time Sharing (CTS) or Mainstream remote computing service.

CTS, based on a 360/67 in Wichita, Kan., enables users to work interactively on problems that require large amounts

of core. The service supports what BCS calls "the most powerful editor available" from any time-sharing vendor, and two or more variations each of Basic, Fortran IV, PL/I, ANS Cobol and Assembly language processors.

Mainstream installed on a 370/165 in McLean, Va., is BCS's "production mode" service but it too supports conversational editing of data. This facility can be extended, a spokesman noted, to allow conversational modification of source decks on file before they are submitted for compilation.

Mainstream accepts both low- and medium-speed transaction-type data entry, and the loading of batched data at medium-speed. The low-speed service (up to 120 char./sec) is supported under a BCS-modified version of TSO; the medium-speed work is handled by Hasp.

Key to the effectiveness of Mainstream, BCS said, is the Job Stream Manager (JSM) software that works in conjunction with OS/360 to process jobs in accordance with the service time period required by the user. It also sorts jobs by type and priority to establish an optimum processing schedule, the company said.

Low-speed service is currently handled directly through user-initiated local phone calls to BCS branch offices. For the present, medium-speed service is provided through a "call-back" arrangement; BCS places a call over its Out-Wats lines to the user who needs the faster service.

The BCS Network includes more than 200,000 "channel miles" of AT&T leased lines, and is available effectively from coast-to-coast. BCS headquarters is at P.O. Box 708, 07801.

Before

Our May 30th **Preview Issue** (B & W close May 18th. Color Close May 11th)

During

The June 6th **Show Issue** (B & W close May 25th. Color Close May 18th)

After

Our June 13th **Wrap-up Issue** (B & W close June 1st. Color Close May 25th)

Whether or not you're going to The National Computer Conference, *Computerworld's* last-minute, complete coverage of the new, consolidated show is must reading—including the latest information on the wide variety of new products which will be displayed. Only a weekly newspaper can give you such complete and up-to-date coverage. And *Computerworld* is the only newsweekly for the computer community.

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ISA Issues Standard For Fortran Usage In Process Control

PITTSBURGH — The Instrument Society of America (ISA) has recently released a specialized Fortran standard for industrial computer or process control systems, so that users in that area of DP can have a common way of handling operations.

The new standard, ISA-S61.1, includes Fortran statements that conform with the American National Standard Fortran, and no changes in standard Fortran syntax are intended, according to ISA.

The new documents presents external-procedure references for use in the process control area. These references, a spokesman explained, should permit interface with both executive programs and process I/O functions, and support manipulation of bit strings in ways that are perhaps unique to the industrial environment.

Both that environment and the ANS Fortran standard may change, the society noted in a preface to its standard, and ISA-S61.1 can reasonably be expected to be updated to keep pace with any such changes. The move to metric measures was cited as one area in particular that could be expected to impact the standard in the near future.

Requests for copies of the standard (\$3 each) and comments should be addressed to ISA at 400 Stanwix St., 15222.

**How a lot of different people
are cleaning up with
Honeywell's Series 2000 computers.**



Honeywell's Series 2000 computers are a family of high-performance systems in the small-to-medium-scale range—from the entry-level 2020 system (with monthly rental about \$1,900) to the large 2070 system (with monthly rental about \$30,000). They're a family with unusual strengths in important areas like operating system software, data communications hardware and software, peripherals capability, and data base management techniques.

What really makes Series 2000 special and so popular, is its dramatic cost-effectiveness. As a result, more and more companies and institutions in just about every industry, and of just about any size, are discovering that Honeywell's Series 2000 offers the most practical and economical answers to their data processing needs.

Here are eight examples:

An auto manufacturer relies on Honeywell computers at manufacturing and assembly plants.

A major automobile manufacturer uses Honeywell 2050 and 2060 systems at manufacturing and assembly plants to handle production-related applications. These include accounts receivable, accounts payable, order processing, invoice processing and product material inventory reports. The systems are also tied to a Honeywell communications network that keeps a central computer supplied with information for inventory updating, parts ordering and shortage reporting. A number of applications handled by the Series 2000 systems are critical to continued production, so proven reliability was vital in the company's decision to move to Series 2000.

Big savings bank puts ten branches on-line for improved customer service.


A large-city mutual savings bank (Metropolitan Savings Bank, Brooklyn, New York) uses two Model 2060 systems to provide better service to its approximately 180,000 customers. One computer is dedicated to an on-line teller system that provides instant two-way communications

between the customer files and 45 teller terminals at ten branch locations. The system was installed to speed up the processing of customer deposits, withdrawals and related transactions, and to allow the opening of accounts and changes of names and addresses on-line, through video display terminals.

The second system is used for batch processing of reports, mortgage loan accounts and general ledger, as well as for new program development. A separate foreground partition of memory is used to access on-line mortgage inquiry files through CRTs located in the mortgage department. Peripherals and communication controllers can be switched between systems, providing complete back-up for the on-line teller system.

Fastener manufacturer centralizes multiplant operation for improved management information and control.

A multidivision manufacturer of industrial and aerospace fasteners (The Lamson & Sessions Company, Brooklyn, Ohio) employs two Series 2000 systems—a Model 2040 and a Model 2050—for factory and business applications. Currently the firm uses remote data entry terminals at its major manufacturing centers for off-line data transmission to the computer center. The customer plans to evolve to an on-line information network. The computerized systems provide the company with improved production and inventory controls which are translated into improved customer service and reduced capital investment plus financial tools to more effectively manage daily operations.



**Big firms,
and not-so-big firms...
just about any company or
organization can profit
from Honeywell's Series 2000.**

State department of education uses computer to handle large volume of school data.

A state department of education (State of Ohio, Columbus) keeps its Model 2050 system working on three shifts to process a heavy load of statistical and recordkeeping chores. A major share of this workload involves accounting applications such as funding, tax base computation, student population, personnel and salaries for the state's 621 school districts. In addition, extensive files, such as teacher certification records, are maintained on the computer. To speed its workflow, the department makes use of data communications under control of OS/2000. CRT and teleprinter terminals are used for data collection at critical locations. A pilot project has also been started by the department to make available the power of its 2050 system to school districts in rural areas unable to afford their own systems. A remote Model 5 intelligent terminal communicates with the state's computer for processing the traditional accounting requirements plus student scheduling, grade reporting and student attendance.

Southern newspaper uses computers for production efficiency and quality control

A large Southern daily newspaper (*St. Petersburg Times and Evening Independent*, St. Petersburg, Florida) uses two

Model 2050 systems. One handles the paper's business tasks such as advertising billings, maintenance of circulation files and payroll. The second is dedicated to newspaper production assignments. It operates in tandem with two Honeywell minicomputers and performs copy hyphenation and justification and related work. The paper is currently converting its production work from off-line terminals to special CRT terminals that will handle both editorial and advertising copy composition on-line. A *Times*-developed programming technique enables the operator of already installed terminals to precompose display ads on the terminal's CRT. After composition by the terminal operator, the ad is computer-processed for hyphenation, justification and insertion of the function codes necessary to drive the photocomposition machines. The Honeywell 2000 computers are an important part of the paper's program to completely convert to cold-type composition and offset printing by 1975.

Distributor depends on computers to achieve inventory control and provide customer service.

A large wholesale tobacco and candy distributor on the West Coast (Glaser Bros., Vernon, California) has attained its leading position through emphasis on superior customer service and effective inventory management. Recently the firm installed dual 2040 systems to keep pace with its fast-growing business and increase its computer management capabilities. A newly implemented sales order

processing system validates customer and item information, checks and allocates inventory, computes discounts and taxes for invoicing, and prints a combined warehouse pick-list and total customer invoice.

In addition, the system provides customer sales analysis; salesman analysis; commodity and brand movement analysis; inventory status; purchasing information; credit analysis; accounts receivable aging and statements; and daily sales, cost and profit by item, commodity group, branch and company.

Paperless system is goal of progressive hospital

A 592-bed hospital (Parkview Memorial, Fort Wayne, Indiana) is using a Model 2050 system as it builds toward the ideal of a paperless hospital. By eliminating the redundant writing and recording of patient services that occur throughout the institution, the hospital plans to relieve doctors, nurses and other professional medical personnel of unnecessary clerical work, thereby making possible an improvement in productivity. A real-time data base management system is being implemented, with the data base to be accessed through remote CRT terminals for applications such as patient accounting, payroll, personnel, payables, inventory, general ledger, property ledger, census, medical records, pathology, patient charts and results reports.

Commercial bank provides broad spectrum of services to branch and subscriber banks.

A 14-branch commercial bank (Framingham Trust, Framingham, Massachusetts) uses a 2050 system to provide comprehensive on-line and batch processing services to its branches and subscriber banks. Bank personnel use CRT terminals to communicate over leased telephone lines with central information files. The video system provides demand deposit, savings, certificate loan and general ledger processing. Inquiries on customer accounts produce cross-referenced information from the central information file, showing the customer's total relationship with its bank for these applications. Complete hard-copy backup is generated automatically for all transmitted information. Many expensive and bulky reports are no longer produced, having been replaced by video displays. The on-line system frees bank personnel from many time-consuming procedures that are necessary with batch operations and conventional data preparation methods.



Seven ways Series 2000 computers are trained to respond.



1. *On-site changes give the user a low-cost way to increase power and performance without replacing his current processor.* Purchase-only versions of Series 2000 central processors can be easily modified at a user's site by augmenting memory and adding memory-speed and input/output power modules.

2. *The DATANET 2000 front-end network processor off-loads the central processor of its communications overhead and maximizes information throughput.* This advanced miniprocessor offers an extremely simplified, low-cost way to expand the computer into an information network, thereby increasing information processing capability dramatically.

3. *Honeywell's new cost-effective 7000 Series terminals get more kinds of communicating done faster at lower cost.* Featuring microprocessor-based designs, the new line includes a low-cost, high-performance CRT terminal, and a passbook banking teller terminal.

4. *Dual disk access gives users big throughput gains and increased availability of data and programs.* A new dual-access technique allows two transfers to take place at the same time on a single disk subsystem. This can make a significant difference where multiprogramming is heavily used and continued concurrent access to at least two spindles on a disk subsystem is required.

5. *Series 2000 includes a full complement of cost-effective peripherals, with special emphasis on disk drive flexibility and performance.* Several types of drives offer two or three spindles per control, and are expandable to eight per control. Fast access times and high data transfer rates make these devices especially well suited to Series 2000 systems.

6. *The OS/2000 operating system provides for as many as ten job operations plus five transcription routines to be processed concurrently.* In addition to dynamic partition management (shifting) and scheduling priorities, a user-selectable dispatching priority scheme governs the amount of processor time received by jobs and allows for maximum system control and throughput.

7. *Series 2000 relates specifically to the user's business environment.* Honeywell's industry-specific system design and pre-coded application packages for a variety of industries have enjoyed wide acceptance due to their emphasis on helping to meet business needs.

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Honeywell Information Systems is itself a success story. We have grown, because we know our growth depends upon our ability to help you grow. Series 2000 is a good example of how we're helping businesses grow.

Honeywell Information Systems (MS061), 200 Smith Street, Waltham, Massachusetts 02154.

The Other Computer Company:
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Data Briefs

Receive-Only Teleprinter Available on RCA Lease

CHERRY HILL, N.J. — RCA Service Co. has introduced a receive-only TTY-compatible teleprinter for \$47/mo.

Supplied by Extel, the unit operates at 75- or 100 word/min and prints with pressure-sensitive paper that can generate up to three copies. The teleprinter can handle five-level Baudot code and an eight-level Ascii model is also available at the same price, a spokesman said.

The terminal is compatible with Bell 101C or equivalent data sets. A ribbon-printing model will be available in May for \$50/mo, a spokesman said.

The Extel unit is a direct replacement for the Model 28 RO TTY which costs \$59/mo from RCA and up to \$67/mo, or more, from Bell operating companies, the RCA spokesman said.

The solid-state terminal is available in about three weeks. Higher-speed models and send/receive versions will be available soon, RCA said. Monthly prices include nationwide maintenance.

Machine-Type Terminals for Mini

EL PASO, Texas — Z-Com Electronics, Inc. has added machine-type terminals to be interfaced with a minicomputer.

The Model R100P can print out information on an adding machine tape, while the R100D has an electronic display output. Using the conventional numeric keys together with calculator functions such as multiplication and division, an operator can update accounts on-line with the CPU.

The terminals are supplied as part of a turnkey system that includes the mini, a 2311 or 2314-type disk storage unit and a tape transport for entering mag tape records into a host computer system.

A "typical" system including 40 R100D terminals, mini and disk storage for 25K records (of 20 characters each) would cost about \$31,300 or \$940/mo, a spokesman estimated. The display unit costs about \$10.50/mo and the printing terminal costs \$15/mo.

Z-Com is at 7700 Alabama, 79904.

Testing Data Sets?

FORT WASHINGTON, Pa. — The Tele-Dynamics Division of Ambac Industries has a data set tester that can be used with either synchronous or nonsynchronous modems.

Called the 7914A, the unit is compatible with the Western Electric 914B and generates a 63-bit pseudo-random pattern. In addition, the tester can generate mark hold, space hold or dotting patterns for performance evaluation. Bit error count is indicated by a two-digit display and overflow indicator.

The 7914A costs \$495. Tele-Dynamics is at 525 Virginia Drive, 19034.

'Health Care Utility'

Dial-Up Net Cares For 'Sick' Hospitals

By Ronald A. Frank
Of the CW Staff

CEDAR RAPIDS, Iowa — Smaller hospitals suffering from deficiencies in in-house DP capabilities can receive good care from a "health care computing utility" called Executive Data Systems (EDS).

In addition to being a service bureau for its hospital customers, EDS operates a distributed computer/communications network that provides the medical facilities with on-line administrative, financial and some medical processing.

National Network

The heart of the EDS network includes dual Burroughs B3500s with 322M bytes of disk storage and an EMR 6135 front-end processor. The 6135 accepts inquiries and other messages from a national network of more than 60 Datapoint 2200 intelligent terminal systems.

The 6135 polls the network of terminals using Wats lines. Incoming data to the Cedar Rapids DP center is transmitted at 1,200 bit/sec and inquiries, according to priority, are entered into a "mailbox exchange area" in disk storage, according to Ray Fergus, EDS vice-president.

The B3500s "watch" the disk area and dynamically reallocate job priorities depending on the incoming traffic.

Each hospital joining the EDS network receives a complete turnkey capability including software for the 2200s, operator training, documentation and anything else required to give the institution a remote DP capability.

"We treat each 2200 as a remote mainframe," Fergus said, adding that most hospitals batch their non-priority data

during the work day. The terminals are then polled at night in unattended answer modes. The B3500s at the EDS DP site update accounting records, billing, payroll, medical records and any other data files maintained by the host CPUs.

Although some medical processing is already on the network, Fergus plans real-time patient monitoring and related critical functions in the future. Most of the hospitals build up their DP capabilities with more routine administrative and clerical recordkeeping functions.

The health care utility services hospitals from coast-to-coast in 15 states.

As an EMR user, the company wondered what would happen when Univac took over the front-end supplier. But any fears were unfounded, Fergus said. If anything, Univac has "more muscle," and support has continued without problems, he added.

Although each hospital becomes a part of the same EDS network, its terminal-

oriented DP capability is custom-tailored to meet specific demands. A typical program written for a hospital might tell an operator how to admit a new patient. This would include instructions on filling out the patient admission forms on the CRT included with the 2200 terminal.

Each hospital is constantly refining its DP capabilities as it adds new functions or changes its requirements, Fergus said.

Before going to its present hardware, EDS had a 360/30 and later a Model 40 connected to a network of IBM 1050 terminals.

One of the advantages of the 2200s and the EMR 6135 is that either system can poll the other depending on the priority of data. The result is a network that combines the advantages of remote batch polling with interactive inquiry/response when necessary.

Each 2200 has a built-in modem that communicates with the 6135 through phone company DAAs. The dial-up net replaced a private line system that was used with the 1050s.

Hazeltine \$49/Mo CRT Terminal Can Transmit up to 9,600 Bit/Sec

GREENLAWN, N.Y. — A low-cost interactive CRT unit designed to replace TTYs has been introduced by Hazeltine Corp.

The Model 1000 terminal will cost \$49/mo on a 12-month lease with maintenance included. Although described as teletypewriter-compatible, the CRT can transmit at higher speeds ranging from

110- to 9,600 bit/sec. Any two of the 10 possible data transmission speeds can be included into an individual display, and either of these two speeds are switch-selectable from the keyboard.

The 1000 handles 64 Ascii alphanumeric and symbols and has an optional lower-case character set of 31 characters. The 960-character screen generates a 5 by 9 dot matrix character instead of the smaller 5 by 7 matrix to allow for certain characters normally "written below the line," such as a "J," a spokesman said.

Parity generation and checking are included in the 1000 and a parity error will cause an indicator to light and a question mark to be generated in the character position on the screen.

Designed primarily for conversational applications, the display will also be cost-effective in mini-based systems which now utilize a higher-priced TTY as the console "typewriter," the spokesman said. The 1000 will include an optional RS-232 interface for peripherals such as a printer and a tape cassette unit. The tape unit will be introduced soon, the spokesman said.

The CRT can operate in either half- or full-duplex mode and is compatible with Bell 103A-type data sets or independent equivalents. An optional Bell 202C data set capability will be available.

First deliveries of the 1000 are scheduled for June. Purchase price for the unit is \$1,790 from Greenlawn, 11740.

Honeywell Provides 600/6000s With Remote Network Processor

WELLESLEY HILLS, Mass. — Honeywell has introduced a remote network processor, the Datanet 700, designed for use with Series 600/6000 CPUs.

The 700 can service up to 128 lines operating at speeds up to 50 kbit/sec. With input/output interleaving, the 700 can handle multiple data streams. The processor has a cycle time of 775 nsec for a 16-bit word consisting of two eight-bit characters. Memory is expandable in 8K increments to 131K characters. Up to eight peripherals can be attached including card systems, mag tape or line printers.

Load Cobol, Fortran

The 700 will enable a host CPU to "deploy" high-performance remote batch, remote job entry and remote message concentration capabilities as part of a 600/6000 system. Users will be able to

load Cobol and Fortran programs at the central site, compile and run them on the mainframe, and print out the program listings at a remote site equipped with a 700.

An RCP-702 configuration, including 4K-word processor for remote batch and remote job entry, will be available in the third quarter of 1973. It includes a teleprinter, card equipment and a single-line communications controller.

The RCP-707 multifunction system with "remote network processing capabilities" will be available in the second quarter of 1974. It will include remote-message concentration, concurrent remote batch, remote file maintenance and OS/700 features.

Prices will range from \$1,000 to \$2,800/mo on a five-year lease or \$40,000 to \$120,000 on purchase.

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Bits & Pieces

Punched Tape Reader Used With Minicomputers

WORCESTER, Mass. — A high-speed punched tape reader and interface package for minicomputer users is available from Decitek.

The Decitek universal reader handles 300 char./sec step-at-a-time asynchronously, and 600 char./sec stop-on-character.

Paper metallized polyester or paper-polyester tapes of 5-, 6-, 7- or 8 levels — with either advanced or center feed hole — can be read interchangeably.

Prices vary around \$1,100 — depending on the minicomputer — from 15 Sagamore Road, 01605.

Contact Printer Uses Film

GLENDALE, Calif. — PSC Technology, Inc. has unveiled a high-speed contact printer, Model CP70, for 16mm, 35mm and 70mm black and white film.

Printing speeds up to 12 ft/sec for 70mm, and 24 ft/sec for 16- and 35mm are provided.

A wide variety of film formats can be accommodated through the use of interchangeable film transports, the firm's spokesman said.

Cost of the CP70 starts at \$8,000 from 1200 Grand Central Ave., 91201.

Stereo, Digitized Table Combined

OGDENSBURG, N.Y. — Users with both stereo plotter and digitized table applications are offered the Gradicon Model GDC/5000 from Instronics, Inc.

The GDC/5000 is a digitizer electronics console which combines in a single cabinet a full alphanumeric keyboard, verifier, 3-axis display, fixed address, 3 axes preset, O modes of operation, utility counter and magnetic tape unit.

This unit is specifically designed to facilitate the digitizing of three-dimensional photographs using the stereo plotter. However, through a switch the user can convert the unit to operate with a standard Gradicon digitizing table, the firm said.

The GDC/5000 is available for \$16,000 from Suite 204, Bridge Plaza, 13669.

Graf/Pen Users Go Remote

SOUTHPORT, Conn. — A remote operations buffer, which enables signal output from the Graf/Pen sonic digitizer and other devices generating output signals in binary codes at TTL levels, to be transmitted over cables up to 100 ft in length, is available from Science Accessories Corp.

Functionally, the buffer amplifies each of the output-signal lines individually to overcome cable capacitance and to preserve the original waveforms.

The 1371 Remote Operations Buffer is priced at \$650 from 65 State St., 06490.

Triple Capacity of 2319

360/50 Users Offered 3330-Type Disks

By Michael Weinstein
Of the CW Staff

SAN FRANCISCO — IBM 360/50 users can attain 370-like performance through a modified 3330-type disk storage subsystem from ITEL Corp. The disk system gives 360/50 users more than three times the storage presently available.

The difficulty in providing a 3330-type capability to Model 50 users stems from the 806 kbyte/sec data transfer rate which is standard for 3330s. As this rate is too fast for the 50 central processor to handle, ITEL redesigned its 7330-2 drives down to a 625 kbyte/sec transfer rate.

Operationally this means ITEL's 7330-2 drives have a slower rotational speed than the standard 3330s. Despite the slower rotational speed, access time for the drives is 2.7 msec compared with the

3330's 3 msec access time and 60 msec for 2319s.

In terms of storage capacity, the ITEL subsystem offers Model 50 users more than three times the volume presently possible with 2319s. For example, a Model 50 with 16 2319s gives the user 466M bytes of on-line storage while the same 50 with 16 7330-2s provides 1.6 billion bytes of storage.

In addition, a user with a Model 50 with eight 7330-2 drives would have 800M bytes of storage. The cheapest IBM standard configuration offering about the same amount of storage and throughput is a 370/145 with eight 3330s. The 145 is about 50% more expensive than the enhanced 50, ITEL said.

According to tests run by ITEL, a 50 with ITEL's additions is about 10% to 15%

slower than the 145.

The other portion of the disk subsystem is the 7830-2, which is necessary to attach the drives. It is essentially a controller mechanism that makes the 50's selector channel act as if it were a block multiplexer channel, a spokesman said. This process allows the 50 user to take advantage of rotational position sensing, command retry and data capacity, he added.

Architecturally, the 7830-2 is a modified ITEL 7830, used for attaching ITEL's 3330-type disks to a Model 65.

On a two-year lease the controller costs \$3,645/mo. Up to 16 drives can be attached to one controller at \$490/mo/drive.

ITEL is at One Embarcadero Center, 94111.

Telex Adds High-Density Tape Drives

TARPON SPRINGS, Fla. — Telex has added four new models to its 6420 magnetic tape series and announced a new control unit.

Three of the models — 6420-44, 6420-66 and 6420-88 — have a 6,250 byte/in. recording density. With the Telex offering, users of the higher end of the 360 series and 370 users — from the 135 up — now have a choice of IBM, Storage Technology and Telex for drives with 6,250 byte/in. density.

The fourth drive is a 1,600 byte/in. unit with increased tape speed.

The Telex drives (like IBM and STC) feature increased data rates and faster access time. Data can be transferred to the host CPU at speeds up to 1.25 Mbyte/sec compared with data transfer rates in the 300 kbyte/sec range for 1,600 byte/in. density drives.

Read/write time is about twice as fast as the earlier 1,600 byte/in. models.

As an optional feature, the Telex drives can be equipped with dual-speed capability. This feature allows users to switch from the higher 6,250 byte/in. density to the standard 1,600 byte/in.

Of the three sources for the higher density tape drives only STC is offering units that allow the user to also switch the data transfer rate [CW, March 21].

To use the Telex drives, users must also obtain the Telex 6803-11 controller which is a replacement unit for IBM's 3803-2 controller, Telex said.

Prices for the Telex models range from \$540- to \$680/mo on a one-year lease, about 15% cheaper than the IBM models and about the same as the STC units.

The three 6,250 byte/in. density drives are slated for delivery in the second quarter of 1974. The 1,600 byte/in. drive with a tape speed of 225 in./sec and data rate of 360 kbyte/sec will be available this June.

Tape Drive Model	Cost/mo	Density	Data Rate kbyte/sec
IBM 3420-4	\$635	6,250 byte/in.	470
3420-6	\$722		780
3420-8	\$801		1,250
Telex 6420-44	\$540	1,600 byte/in.	470
6420-66	\$615		780
6420-88	\$575		1,250
6420-8	\$575		360
Controller			
IBM 3803-2	\$1,040	**	
Telex 6803-11	\$940		

**For about \$20/mo more, both IBM and Telex will provide the capability to switch between the two densities.

Comparison of Telex, IBM Tape Drives

Two Printers Support Medium, High Speeds

ANN ARBOR, Mich. — Sycor has two printers for use with its Model 340 intelligent terminal to support medium- and high-speed print needs.

The Sycor Model 3486 printer can handle 300 line/min on a 132-char. line or 600 line/min for a 72-char. line.

The Model 3481 is an 80 char./sec printer for medium-speed applications.

Both models are capable of printing one original and five copies in either batch or unattended communications mode.

The 3486 is available on a yearly lease arrangement for \$470/mo, including maintenance. The 3481 is available for \$175/mo from any Sycor branch office or 100 Phoenix Drive, 48104.

Firm Takes Good 'Stock' of COM

NEW YORK — The installation of a computer-output-microfilm system has brought considerable savings — in time, money and space — to Pershing & Co. here.

Pershing provides trading, clearing, research and communications support for over 50 stockbrokers and uses the COM unit to produce stock records and transaction reports. Connected on-line to two 360/50s, the unit is about eight to 10 times faster than the printers used previously, according to Harry Buonocorri, vice-president of the firm.

In addition, the COM unit was less expensive than acquiring another impact printer which would have been necessary to handle the firm's growth,

he said.

The rental for the Memorex 1600 system, used to produce four reports daily, is less than that required for former service bureau microfilming of only one of the reports, he claimed.

The firm now stores six years of records in a space formerly occupied by only nine months of less voluminous records, Buonocorri said.

Pershing has been running the 1600 for about three years and is quite satisfied, he said, adding that conversion was relatively simple.

"We changed one card in our program deck, directing the CPU to the COM unit in lieu of an impact printer, and we were ready to run."

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No National Standards

Power Service Inadequate for DP

By Michael Weinstein
Of the CW Staff

Several times a year, especially in cold weather, Hi-Pro Feeds, Inc.'s computer goes down.

There is no warning and no way to determine when the next crash will occur as the cause may be with the power company ten miles away.

This problem is not unique to this Friona, Texas, firm. A large portion of the computer user community faces the same type of power problem.

In Hi-Pro's case the difficulties arose from an especially severe ice storm. Ice collected on the power wires causing them to hang lower to the ground. The winds kicked the wires around, contact between two wires was made and randomly-timed shorts occurred.

For the power company, these shorts were uncomfortable but not considered a major problem for the average user of electricity.

Even if a feeder wire goes completely down, the other feeder wires from the main cable are only down about 500 msec, the time needed for the circuit breaker to reset itself, explained Don French of South West Public Utility.

Five hundred msec makes very

little difference in normal customer use as lights will hardly flicker and an electric coffee maker will not even miss a perk. But for computer users 500 msec can be fatal.

Sci-Data, Atlanta, supplier to Hi-Pro, conjectured that users in southern areas were more likely to be hit with line problems because the local power companies did not expect cold weather problems and thus it was not worth the added expense to build more solid poles and use thicker wire.

French denied these allegations, however, stating that there were conventions that guided all power companies throughout the U.S. as to the type of poles and gauge of wire used.

But a spokesman for the Boston Edison Co. said he knew of no universal standards. "Power companies are like everyone else," he said, "they use the equipment they have."

He explained that power companies buy wire in great quanti-

ties and the wire not used is stored. If a line breaks they go to the storehouse and use the wire nearest at hand.

High Reliability Users

The real problem, is that power companies are not set up to support the needs of the computer and other users who need high reliability.

One new improvement that is beginning to take hold in the power companies is triplex wire. Triplex wire is actually three wires wrapped around each other, the Boston Edison spokesman explained.

The advantage of this approach is that the wire is much stronger and less likely to break under the pressure of falling trees. But, he concluded, it will be some time before this wire is used uniformly throughout the country and even now the major criteria for its use is the incidence of falling trees and not the potential damage a fallen wire might cause a sensitive user.

Users Don't Make Their Case Heard

There are no uniform standards for utility companies that cover safeguards against environmental problems, according to Everette Kreeger of the National Association of Regulatory Utilities Commission (Naruc).

This means computer users have no official recourse if they feel the local power company is providing inferior service.

There is no standard which states poles must be so far apart or wire must be so thick. Each state is governed by its own power commission, Kreeger added.

But, he said, Naruc is aware of the problem for the computer user and has set up a subcommittee, the Staff Committee on Computers, to study the problem.

Unfortunately, the committee has had only two meetings in the past year and as yet does not

have an organizational plan, according to committee chairman Harold Howie.

Spokesmen from several state power companies indicated that the utilities companies have lobbies which make their views known while the computer users are not really represented. This means legislation requiring power lines to be put underground, for example, can be opposed by the power companies on the basis of cost with no rebuttal from computer users.

While the state power commissions say they would welcome testimony from local computer users it appears the users have not taken the trouble or do not know of the existence of these bodies.

In a few local regions where concerned users have tried to make their needs recognized they have been successful.

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DUCS-VI will be available during the 3rd quarter of 1973. Version 6 will support both local and remote IBM 3270 Display Systems providing users with a convenient means of utilizing the enhancements of the IBM 3270 System.

Requests for DUCS-V should be submitted to C F S. License agreements, DUCS-V abstracts and other details will be sent by return mail. Inquiries may be directed to Mr. Richard K. Goran.



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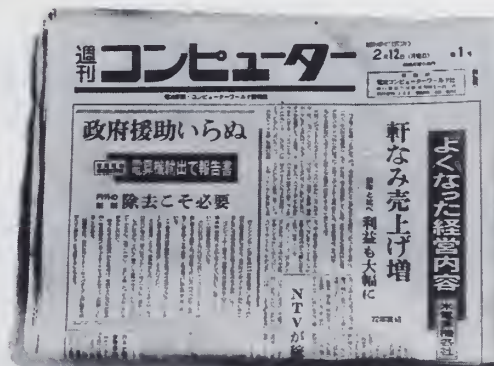
Hideo Hirayama, President of Dempa Computerworld Company and Patrick McGovern, President of Computerworld, Inc. look at the first copy of *Shukan Computer*.

Dempa Publications is the leading Japanese electronics publisher.

Dempa publications is currently the leading Japanese publisher of information services on electronics, including *Dempa Shinnbun*, the 200,000 circulation daily newspaper of electronics. Dempa maintains twenty-five editorial offices throughout Japan, the U.S. and Europe, which, along with *Computerworld's* editorial staff and correspondents, will provide the largest newsgathering organization of its kind in the world.



The Staff of Dempa Computerworld Inc.



Dempa Computerworld Inc. will do more than publish.

The new company set up to publish *Shukan Computer* is called Dempa Computerworld, Inc., and it will become involved in a variety of communications activities. It will conduct surveys on the Japanese computer market, hold seminars on new computer equipment and techniques, and, in early 1974, plans to run a "Computer Caravan" Forum and Exposition. Similar to the U.S. Caravan, the Japanese Caravan is tentatively scheduled for five of Japan's largest cities. Right now, *Computerworld's* U.S. and European Caravans are scheduled for 28 cities in 1973, and a total attendance of more than 85,000 professional visitors is expected.

Japanese computer market large and growing.

Right now, Japan is the largest single-country computer market outside the U.S. As pointed out by *Computerworld's* President, Patrick J. McGovern, "There are now over 15,000 computers installed in Japan, and the number is growing at over 25% per year. This growth and the current liberalizations of Japanese import policy on computer equipment makes Japan an especially attractive market for computer product and service marketers headquartered in the U.S. and Europe."

The Japan Ministry of International Trade and Industry indicates that by the end of 1975 there will be 38,000 computers worth over \$12 billion in Japan. There will also be very rapid growth in the use of peripherals and terminals, and services and contract software, providing almost unlimited business opportunities.

Shukan Computer's Circulation starts at 35,000

Initial circulation of *Shukan Computer* is guaranteed at 35,000, which provides in-depth coverage of computer users and industry personnel. Based on IDC data file lists and the resource lists of Dempa, circulation is divided about 80% to end-users and 20% to the computer industry. Circulation development methods will be the same as those which gave *Computerworld* the highest paid circulation in its field in less than four years.

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Advertising sales for *Shukan Computer* will be handled in the United States by Computerworld Representatives. Rates are reasonable, based on a CPM of \$35 (at current conversion levels—All rates are in Yen, and are estimated in dollars for convenience only). Full-page units are 9½" x 14½". Smaller units are available.

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Telex Suit Documents Reveal:

How IBM Sized Up Independents, Projected Market

Plug-Compatible Growth Seen

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. — At year-end 1970, plug-compatible manufacturers had installed 5,350 tape drives on IBM systems and 2,415 disk drives and the curve for the growth of such installations was clearly up, according to confidential IBM documents released here in the IBM-Telex antitrust suit.

According to the IBM market research, the installation of independent tape drives had begun in 1967 when 200 such units had been installed.

By the next year, users had installed 1,100 of the devices and the figure rose to 2,926 in 1969 and then hit the 5,350 figure the next year.

IBM said the independents had installed 4,000 of the 2400-type tape drives by the beginning of 1971, with the remainder made up of the older 729-type drives made by the independents.

Activity in the disk area started in 1968 when 150 of the 2311-type drives were installed by independents, increasing to 968 independently made units by the next year and reaching 2,060 of the 2311-type drives installed by the independents at the beginning of 1971.

Activity in the 2314-type drive area started in early 1970, the figures showed, and has been an almost straight line since then, according to the charts.

Starting from nothing in early 1970, the independents had installed 2,355 of the 2314-type units by Jan. 22, 1971, and the figure hit 3,006 independent installations by Feb. 12, 1971, according to the IBM charts.

The figures are compiled from weekly activity reports that the market researchers receive from the field.

Competitors' Share

In the tape drive area, IBM indicated Telex was responsible for 50% of all the independent tape installations at the end of 1970, followed by Potter with 40% of the independent units.

The document claimed that IBM had 29,742 of the 2400-type tape drives installed at the end of 1970, and said that the independents' share of the market was 13%.

At the beginning of 1970 IBM said it had 47,298 of the 2314 spindles installed in the field compared with the 3,006 installed by the independents in early February of the next year.

Of this independent portion of the installed base, IBM said Telex had 40% and

Memorex 45%.

At the Feb. 12 point, the IBM figures indicated the independents — or "other equipment manufacturers" as IBM likes to call them — had orders of 3,780 of the 2314-type spindles and that Memorex and Telex each had a 37% share of the on-order spindles.

No Blockades Seen

"All the major PCM's (IBM jargon for plug-compatible manufacturers) are moving quickly in this fast-growing mar-

IBM Charted Market Shares

TULSA, Okla. — Industry marketing executives are now getting a chance to compare their marketing projections with those made by IBM. The figures were released in previously secret IBM docu-

IBM Appraises Competition

TULSA, Okla. — The documents released in the Telex-IBM case last week contain an analysis of how IBM viewed the strengths and weaknesses of its competition in the peripherals area in early 1971.

What follows is a capsule summary of how IBM estimated the strengths and weaknesses of four of the major firms.

The strengths of Telex were seen to be "broad product line, large customer base, proven sales and service, adequate financing, competent management," while the weakness of the firm was seen to be "engineering dependence, ISS."

Potter's strengths were listed as "engineering, OEM contracts, broad

product line," while the IBM planners found its weaknesses to be "marketing, new end-user market, MAI debt."

The Memorex strengths were seen to be "large sales/service, aggressive management, substantial R&D, customer base," while the one weakness listed was "inadequate financing."

Century Data was seen to have only one strength, "OEM contracts," while three weaknesses were found, "finance, late, marketing," the last referring to the Calcomp (parent company of Century) "sales engineering approach" which IBM estimated to be the firm's "key drawback at this time."

ket," the IBM document went on.

"There appear to be no substantial engineering, manufacturing, marketing or servicing constraints to prevent rapid growth of their installed base."

However, the document noted that the financing and management of the companies might be the only areas of weakness, even though it could not assess these factors at the time the report was prepared.

Profit Margins

The independents could attain profit margins of 25% to 30% even after cutting prices of various products below those of IBM, the report noted, but added that the independents' chances for profits "will ultimately be determined by the impact of new product and price announcements."

The chances are, the document continued, that "permanent capital to support a rapidly growing level of business may not be available when it is needed."

In the management area, continued growth of the independents "will in itself produce success or failure, dependent totally upon the direction given by PCM management," the document said.

"Management of resource will be the key to product line profitability while attaining forecasted installations, and as a constraint should be considered as critical to success as finance," the report said.

1969 and 1976.

These IBM charts do not contain a reference to the basis for the figures, which could stand for either IBM points (which equate to revenue dollars per month) or number of units.

The charts, however, show that starting from a base of 5% in 1969 the independents were expected to go to 10% of the market in 1970 and then to 16% of the market in each of the next four years.

Those percentages are for the percent of the lease market held by the plug-compatible makers for each of those years, according to the document.

The 2311 disk drive market was seen as declining rapidly over the 1969 to 1976 time period, but the independents' share was expected to rise.

Given a value of 16.3 in 1969, the market was expected to decline to 1.3 by 1976 but the independents' share was expected to rise from 6.3% to 28% in the same time span.

Peak in 1972

The market for 2314 files was estimated at 20.6 in 1969 and was expected to peak at 46.8 in 1972 and then decline to 22.8 by 1976.

For the 1969-1976 time frame, IBM estimated that in 1969 the plug-compatible manufacturers would have none of the market, they would have 2% in 1970, 6% in 1971, 11% in 1972, 21% in 1973 and a 34% market share in 1975 and 1976.

In the area of Merlin files, which later became the 3330, IBM predicted that the independents would have 0.5% of the market in 1972, 3.2% in 1973, 11% in 1974 and a 27.9% share of the lease inventory by 1976, if IBM took no actions to slow the penetration of the IBM base.

In total, IBM estimated the 3330 or Merlin market to be worth 9.9 in 1972, 21.2 in 1973 and to peak at 34.2 in 1975.

UCC Hit With Class Action Suit

WILMINGTON, Del. — A class action suit against University Computing Co. was filed in Federal District Court here by W. Henry DuPont on behalf of himself and all other stockholders who have bought stock since Jan. 1, 1971.

The suit charges that UCC and its officers "conspired for the purpose of fraudulently inducing the class to purchase shares of common stock of UCC for a grossly excessive consideration."

UCC had no comment.

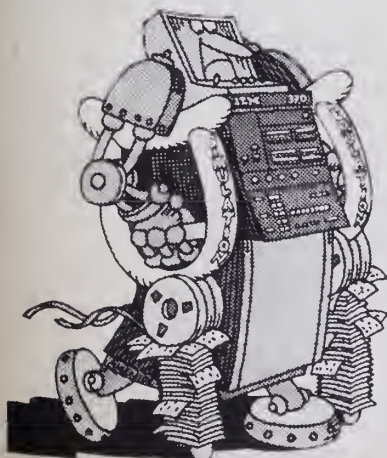
DuPont is a familiar figure to UCC since he and his firm, Sci-Tech, of Wilmington, have been embroiled in other suits with UCC in the past.

The suit claims UCC failed to disclose, even though it was known, that the firm

would suffer losses in excess of \$135 million and that the firm and its officers tried to hide evidence of the losses.

Most of the allegations involve the UCC decision to get into the data communications business. The suit alleges that the formation of Data Transmission Co. (Datran) "was totally unnecessary to the proper function of UCC's computer utility business" and that UCC failed to inform the public that services similar to Datran would be available from AT&T, Western Union and MCI at lower rates than possible for Datran.

The suit alleges UCC and its officers decided to put every available resource of the company behind the Datran effort "to the serious detriment of and at the expense of existing UCC operations."



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Alphanumeric CRTs May Lead Display Market's 24% Growth

PALO ALTO, Calif. — The information display market will grow at a "dramatic" rate of over 24% annually with total sales more than doubling from \$310 million to \$737 million by 1976, according to a recent report from Quantum Sciences Corp. here.

The computer industry market research firm indicated the trend may lead to the domination of the advanced technology display market by the semiconductor manufacturers because of the integration of display, decoder and drive electronics.

The report found that alphanumeric CRTs will be the largest segment of the market in 1976 with a 75.7% share of the sales, up from its 64.5% share of the total market in 1972.

Graphic CRTs will show a decrease in market share from the 14.1% of the market held in 1972 to 9.6% in 1976.

Light-emitting diodes will also decrease in popularity slightly from the 1972 figure of 7.9% of the market to a 1976 figure of 6.6% of the overall display market.

Liquid crystal displays are expected to show an increase in market share, however, the firm noted, going from .8% of the market in 1972 to 2.1% of the total market in 1976.

Three Minority Firms, Informatics Sign

COLLEGE PARK, Md. — Informatics, Inc., contractor for the Nasa Scientific and Technical Information Facility, has awarded subcontracts totaling \$410,000 to minority business enterprises.

The three black-owned firms were awarded a total of four subcontracts. Reliable Engineering Associates, Inc., Philadelphia, was awarded two subcontracts — one of \$98,385 to catalog technical information, and one of \$92,900 to reproduce and photograph microfilm.

Automated Typographics, Inc., Arlington, Va., was awarded a \$134,000 contract to abstract and index technical information.

The final contract, for \$92,000, went to Plato Systems, Inc., Silver Springs, to perform computer data entry work.

Inforex Reorganizes Market Operations Into 6 Regions

BURLINGTON, Mass. — Inforex, Inc. is reorganizing its marketing operations into six regions and a Federal Business Operation.

Three new marketing regions have been established. The East Central region, based in Cincinnati, will be headed by William G. Moore Jr. Jerry T. Kendall will supervise the Southeastern region, and Richard L. Moser the Dallas-based Southwestern region.

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Manufacturing Process

Testing 'Best' Start Point for Automation

By E. Drake Lundell Jr.

CW Washington Bureau

NEW YORK — The test function in the manufacturing process has the "greatest potential" as the starting point for computerization "because it can help in setting priorities for automation of the remaining functions."

In addition, automation of the test function can also "point up problems in the other areas that aren't even related to automation," according to Stan Reese of General Automation at a recent conference here.

Noting that the "computer will be the brains of the automation revolution" that is coming for factories, Reese pointed out that factory automation will be justified "by our need for increased productivity."

For every dollar achieved, he noted, by reducing the cost of manufacturing a product, a company can realize as much as 50 cents of it in profit, therefore making reduction in manufacturing cost more profitable than increases in sales.

In the past, he said, it had been hard to justify the use of computers in the manufacturing process because of their size and cost, but, he noted, the advent of the mini

and its lower price tag had made their use practical.

In addition, he stressed that the mini-computer had made it possible for companies to take a "bottom up" or evolutionary approach often used with large systems.

While he said the top-down approach was a legitimate one, he indicated it was extremely expensive and took a great deal of effort to accomplish correctly.

The bottom up approach, however, "is more cost-justifiable in the long run," he said, because it takes "the processes in use already and improves on them by automating from the worker level on up to the executive level. This means that every responsible person in a manufacturing environment can improve his productivity at his own level," Reese stated.

Faster Equipment

The introduction of the computer to

the production test stand resulted in test equipment that was faster and more thorough than its hardwired counterpart," he noted.

But in the early days, he said, "it also was more expensive" and it shared some of the undesirable aspects of the hardwired test equipment that had been in use earlier.

However, he said, the advent of the minicomputer permitted the development of programs that were easy to understand and change by production personnel.

"The language is considered easy to learn because it's written in terms that relate to the product being tested — not to the computer doing the testing.

"This important concept is the key to putting the ability to write, change or modify test programs and procedures where it belongs — with the manufacturer, not with the test equipment vendor or the computer vendor," he stated.

Soviet Computer Has 'Home-Grown' ICs

Novosti Press Agency
Special to Computerworld

MINSK, USSR — The production of a new EC-1020 computer utilizing integrated circuits is now under way at the Ordzhonikidze plant here. This machine is the first of the Ryad Series.

The emergence of this machine and its serial production indicate advances in semiconductor.

Soviet integrated circuits were displayed in 1969, 1970 and 1972 at many international exhibitions, including those in Paris and Scandinavian countries.

The USSR presently turns out a wide range of standard integrated circuits.

Automatic equipment has been designed for specialized enterprises turning out microelectronic equipment, which has made it possible to start mass-scale production of integrated circuits.

Foreign Orders & Installations

U.C.E. Linalux, a Belgian electric utility, has ordered a Systems 85 computer from Systems Engineering Laboratories, S.A., France, to keep plant operators informed on current and forecast network status.

Compagnie Generale de Geophysique, Paris, is installing a Control Data Corp. 6400 computer system to handle seismic data processing applications.

Dai-Ei Co., a retail chain store company in Japan, has ordered multiple electronic data processing systems from Takachiho Burroughs Co., Ltd. The systems, including three B 4700s and ten B 1700s, will be used in a large-scale, on-line merchandise distribution control system.

The Nationwide Building Society, a large British mortgage loan institution, has ordered a Univac 1110 system to administer a data-collection system and provide on-line inquiry facilities.

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Foreigners Increase Share of Japanese DP Market; Total Deliveries Decline

By E. Drake Lundell Jr.

Of the CW Staff

TOKYO — Total computer equipment deliveries in Japan for the six-month period ending last September were down slightly over the previous six months, but the foreign share of

that market was up dramatically in the same period, according to figures compiled by International Data Research here.

Total deliveries were valued at \$634.7 million, down 0.5% from the \$638 million worth of equipment delivered in the previous six months.

The foreign share of the deliveries, however, was put at \$321 million, up 39.4% from the \$230.3 million reported in the previous six-month period. The figures for foreign manufacturers include the shipments from firms manufacturing in Japan which are controlled by non-Japanese, such as IBM, the research firm said.

Systems deliveries, excluding minicomputers, were valued at \$522.3 million for the period, a gain of 2.4% over the \$510 million delivered in the previous six months.

The foreign share of this market segment was \$256.7 million, a substantial 49% jump over the \$172.3 million reported in the previous half-year period.

Deliveries of peripheral equipment were down 12.2% at \$112.3 million from \$128 million, the firm said.

However, the foreign share of these deliveries was up by 10.9% from \$58 million to \$64.3 million, International Data Research said in its report.

A breakdown of the figures showed the shipments of large computers was up 16.1% during the period, but that foreign firms outpaced this growth with shipments of large systems up 60.1%.

In the area of medium-scale systems, the entire market was down 24.8% in deliveries, and

the foreign share of this segment also dropped slightly, from \$30.7 million to \$30.3 million in shipments.

Small Systems Segment

While deliveries of small systems were down 10.6%, the foreign share of this market climbed, increasing 50% from \$6 million to \$9 million between the two time periods, International Data Research said.

Japanese manufacturers showed their best performance in the area of very small systems, the figures indicated, showing the total market for these devices up 113.6% while the foreign share of this market was up only 67.9%, according to the study.

The figures indicate that at least statistically the Japanese government has been "very quick" to permit foreign sources to increase their share of the current hardware deliveries in Japan to the 50% level promised in mid-1972, the firm said.

The speed of the change is evident from the figures which show that foreign sources supplied only 3.1% of the deliveries in the October to March 1972 time period and 50.6% of the market during the next six months, after the protective regulations were eased, according to the report.

The deliveries of general-purpose computer hardware coming from foreign sources (which includes IBM Japan) during the last six months enabled the foreign firms to install \$551.3 million worth of equipment for the entire year ending last September, the report noted.

Entrex Founder Dies

BURLINGTON, Mass. — Barry M. Harder, chairman of the board of directors of Entrex, Inc., and a founder of the firm, drowned last week in a boating accident.

He served as the key-to-disk company's first president, from June 1969 to February 1973. His recent responsibilities included international marketing arrangements and major business development.

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Fletcher Jones Estate Contested

CW West Coast Bureau

LOS ANGELES — Actress Sherry Jackson has filed Superior Court claims totaling more than \$1 million against the estate of the late Fletcher Jones, former chairman and chief executive officer of Computer Sciences Corp.

Jackson's attorneys, Marvin Mitchelson and Donald Woldman, said she lived with Jones for five years prior to his death in a private plane crash Nov. 7.

The attorneys said Jones had promised to provide at least \$25,000 annually for her during

her lifetime and had not repaid a loan of \$77,000 made by Jackson.

Varian Unit Sold

CW West Coast Bureau

SANTA ANA, Calif. — Micrographic Technology Corp., manufacturer of an automatic microfiche camera processor, has been acquired from Varian Associates, Palo Alto, by Bruning Division of Addressograph Multigraph Corp. for an undisclosed sum.

A Micrographic spokesman said the purchase is expected to broaden the company's marketing base. The firm's product line includes the Model 750 processor, and an automated retrieval display device.

CI Shorts

Univac Wins GSA Pact

WASHINGTON, D.C. — The General Services Administration has awarded Sperry Rand Corp. a \$30 million lease contract for 15 Univac Model 1108s for the Army personnel center in Alexandria, Va. The agency also has a purchase option on the equipment, which could reduce the total value of the contract.

Antitrust Helpers Named

NEW YORK — Three men have been appointed by Federal Judge David N. Edelstein to evaluate whether documents submitted in the government's antitrust suit against IBM are "privileged."

Prof. A. Leo Levin, University of Pennsylvania Law School; Dean Joseph M. McLaughlin, Fordham University Law School; and Bernard S. Meyer, former State Supreme Court Justice for Nassau County, N.Y., were named by Edelstein.

IBM Lands British Air Pact

LONDON — British Airways' bid to purchase dual IBM 370/168s has been approved by the Department of Trade and Industry. The other bidders were reportedly Univac and ICL. The British firm withdrew early in the bidding process.

The equipment replaces BOAC's dual IBM 65s and Univac equipment at BEA.

Correction

Figures on Control Data Corp. earnings from rentals and sales [CW, April 25] were erroneous. Revenues from rentals and service totaled \$95.6 million up from \$62.4 million in the year-ago quarter ended March 31. Sales rose to almost \$105 million from \$65.3 million in the same 1972 period.

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DP Firms Sought For Madrid Fair

WASHINGTON, D.C. — The U.S. Department of Commerce is sponsoring participation of 12 exhibitors in Simo, the International Office Equipment Fair, Nov. 9-18 in Madrid, Spain.

The Commerce Department plans to have 50% of the exhibit devoted to computers and related equipment, with special emphasis on minicomputers, and the other half on business equipment and systems, featuring micrographics equipment.

The purpose of the exhibit is to introduce new-to-market firms and to find Spanish agents and distributors for them, according to the department.

Although U.S.-based firms currently hold 80% of the Spanish large computer market, foreign firms hold the major sector of the minicomputer market, Commerce said. Projections call for the fastest growth to occur in the minicomputer field, the department added.

Overall Spanish imports are expected to grow by about 15% annually, according to Commerce estimates.

The American Embassy at Madrid has ranked computers and business equipment and systems second among those product categories which it believes to have the highest potential for incremental export sales and which would bring maximum results if promoted in fiscal year 1974.

It cited estimates by the Spanish Ministry of Industry that the business and data processing equipment market will grow by 25% annually.

Executive Corner

■ Herbert V. Boshea has been promoted to the post of vice-president, material, in the Sperry Univac Division of Sperry Rand Corp. Boshea joined Univac in 1965 and was most recently the firm's director of materials.

■ James Murdakes has been named vice-president, marketing operations, for Control Data Corp. He was formerly general manager, computer systems marketing.

■ Albert Francis has been elected vice-president, systems development, at Greenwich Data Systems, Inc. He is in charge of all contracts and development in the New York area.

■ Arthur M. Randall, former director of marketing for Kidde Computer Services Co., has been appointed vice-president, marketing.

■ Hayden E. Williams has been named vice-president, marketing, for Computer Leasing Co. and Ward T. Shields was named vice-president, equipment and traffic management.

■ William P. Flies has been promoted from corporate staff member to vice-president, special systems, for Technalysis Corp.

■ Robert H. Grant has been appointed vice-president, systems sales and consulting, for Centurex Corp. (formerly Systems Associates, Inc.).

■ B.F. Powers, formerly manager for government systems, has been named vice-president, equipment acquisitions, of Computer Leasing Co.

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Comten Up, Wiltek Down

2 Communications Firms' Earnings Vary

Two communications equipment makers registered mixed results in recent periods, with Comten, Inc. marking its first year of profitable operation and Wiltek, Inc. showing reduced earnings for the first quarter.

Although Comten's 1972 revenues were down to \$6.5 million from \$8.2 million last year, earnings, after a \$108,000 tax credit, totaled \$219,177 or 11 cents a share compared with a loss of \$66,509 a year ago.

The value of shipments in 1972 exceeded the 1971 figure by 65%, and included a substantial number of installations for the Comten 3670s, President Donald J. Herman said. These were made under two-year leases and recorded under the operating method of accounting, which contributed to the decline in revenues, Herman said.

Wiltek's first-quarter earnings dropped to \$38,000 or 3 cents a

share compared with \$107,000 or 8 cents a share in the same period last year. Revenues grew to almost \$2 million from \$1.2 million in the 1972 period.

Maintenance Costs

A significant increase in expenditure associated with the establishment of Wiltek's system maintenance capability contributed to the earnings decrease, President Robert J. Am-

man said.

The cost of providing nationwide system maintenance has grown from an insignificant amount a year ago to a level of approximately \$260,000 or 13% of sales revenue during the first quarter of 1973, he said.

But with anticipated economies of scale, the impact of these costs will begin to decrease throughout the remainder of 1973 and 1974, he added.

Sycor's First Quarter Earnings Approach Those for All of 1972

ANN ARBOR, Mich. — Sycor, Inc. has turned in a record first quarter, with earnings approaching those of entire 1972.

Revenues rose to \$6.5 million from \$2.9 million in the year-ago period, and earnings turned around to \$1 million or 37 cents

a share, including a \$470,000 tax credit, compared with a loss of \$35,700 in the year-ago quarter.

In 1972, Sycor earned \$1.2 million, in its first profitable year.

"It is gratifying to note that performance during these three months roughly equals that of the full year of 1972," President Samuel N. Irwin commented.

"Moreover, the latest increases in revenues and profitability were attained at a time when Sycor has begun to establish a lease base . . ." At the beginning of the year, the firm obtained a \$3 million credit line from the First National Bank of Boston, which it is using to build its lease portfolio.

"As the year progresses, we expect to utilize Sycor's improved position to expand our product base while increasing market penetration," Irwin added.

Datapoint Scores Record Earnings

SAN ANTONIO, Texas — Datapoint Corp. has reported record earnings for the second quarter and first half ended Jan. 31.

In the quarter, earnings reached \$389,000 or 22 cents a share compared with a loss of \$600,000 or 46 cents a share for the year-ago period. Revenues rose to \$4 million from \$1.1 million.

For the half year, earnings totaled \$545,000 or 32 cents a share compared with a loss of \$1.2 million or 93 cents a share for the restated first half of fiscal 1972. Revenues rose to \$6.9 million from \$1.8 million a year ago.

Shipments Up

The purchase value of equipment shipped to customers for sale or lease increased to \$10.3 million from \$2.7 million a year earlier, the firm said.

In addition, the monthly shipment rate of Datapoint 2200s rose to 129 systems during the first half, up from 46 systems in the previous year.

Shipments averaged 200 systems per month during January and February, the firm added.

Computer Automation Quarter, Nine-Month Earnings Rise Sharply

IRVINE, Calif. — Third quarter and nine-month results are up considerably from those a year ago at Computer Automation, Inc., maker of the Naked Mini.

In the quarter ended April 1, revenues more than doubled to \$3.1 million compared with \$1.2 million in the year-ago period.

Earnings soared to \$271,020 or 16 cents a share from \$84,827 or 6 cents a share in the 1972 period.

In the nine-month period, revenues reached \$7.9 million compared with \$2.9 million a year ago, while earnings totaled \$665,927 or 42 cents a share compared with \$165,270 or 13 cents a share.

"This marks the seventh consecutive quarter of increased sales and earnings for the company. Pretax profit margins have steadily increased to over 18% for this quarter and 17% for the nine-months period," President David H. Methvin observed.

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X	RANGE	APR 26	NET	PCT
C	(1)	1973	CHNGE	CHNGE
H				

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O	BRANDON APPLIED SYST	1- 1	5/8	0	0.0
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N	COROURA CORP	6- 15	7	- 3/4	-9.6
O	OATATA8	3- 4	2 1/2	- 1/4	-9.0
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N	ELECTRONIC DATA SYS.	37- 56	36 3/4	-1 1/4	-3.2
O	INFORMATICS	3- 6	3 1/8	- 1/4	-7.4
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A	MANAGEMENT DATA	2- 5	2 1/8	- 1/8	-5.5
O	NATIONAL CSS INC	8- 41	24 3/4	-2 1/2	-9.1
O	NATIONAL INFO SRVCS	1- 2	1 1/8	- 1/8	-10.0
P	ON LINE SYSTEMS INC	13- 17	12 7/8	-1 1/4	-8.8

N	PLANNING RESEARCH	3- 7	3 3/4	- 1/4	-6.2
O	PROGRAMMING METHODS	22- 24	21 3/4	- 3/8	-1.6
O	PROGRAMMING & SYS	1- 1	7/8	0	0.0
O	RAPIDATA INC	13- 24	13 3/4	-1	-6.7
O	SCIENTIFIC COMPUTERS	1- 2	1 1/8	0	0.0
O	SIMPLICITY COMPUTER	2- 4	2 1/4	+ 1/8	+5.8
O	T8S COMPUTER CENTERS	3- 4	3	0	0.0

O	TCC INC	1- 1	1 1/2	0	0.0
O	TYMSHARE INC	7- 12	7 1/8	- 1/2	-6.5
O	UNITED DATA CENTER	5- 6	4 1/4	- 3/4	-15.0
N	UNIVERSITY COMPUTING	7- 11	7 1/2	- 1/2	-6.2
A	URS SYSTEMS	4- 8	4 1/4	- 1/2	-10.5

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT	16- 34	16 1/8	-3 5/8	-18.3
O	ADVANCED MEMORY SYS	12- 23	14	- 3/8	-2.6
N	AMPEX CORP	4- 7	4 7/8	+ 7/8	+21.8
O	ANDERSON JACOBSON	4- 6	5 1/2	0	0.0
O	BEEHIVE MEDICAL ELEC	6- 10	8 1/2	-1 1/4	-12.8
A	BOLT, BERANEK & NEW	8- 12	8 1/4	- 5/8	-7.0
N	BUNKER-RAMO	6- 18	15 1/8	+9 1/8	+152.0

A	CALCOMP	9- 13	9 1/8	-1 5/8	-15.1
O	CAMBRIDGE MEMORIES	10- 15	9 1/8	-1 1/2	-14.1
O	CENTRONICS DATA COMP	13- 28	24 1/4	-1 3/4	-6.7
O	CODING CORP	11- 19	10 1/2	-1 1/2	-12.5
O	COGNITRONICS	1- 3	2	+ 1/2	+33.3
O	COMPUTER COMMUN.	2- 4	2	- 1/4	-11.1
A	COMPUTER EQUIPMENT	2- 3	2 1/4	0	0.0

O	COMPUTER MACHINERY	8- 13	8	- 7/8	-9.8
O	COMPUTER TRANSCIVER	2- 6	2 1/8	0	0.0
A	COMPUTEST	3- 5	4 3/4	0	0.0
N	CONRAC CORP	20- 32	20 3/8	-2 1/8	-9.4
A	DATA PRODUCTS CORP	3- 4	3	- 1/4	-7.6
O	DATA RECOGNITION	2- 3	1 1/2	0	0.0
O	DATA TECHNOLOGY	2- 5	2 3/4	- 1/8	-4.3

O	OI/AN CONTROLS	2- 4	2 3/8	- 3/8	-13.6
N	ELECTRONIC M & M	3- 6	3 7/8	+ 1/8	+3.3
O	FABRI-TEK	3- 5	2 3/4	- 1/4	-8.3
O	GENERAL COMPUTER SYS	6- 9	6	0	0.0
N	GENERAL ELECTRIC	60- 76	60 7/8	-3 1/4	-5.0
N	HAZELTINE CORP	7- 9	6 3/4	- 7/8	-11.4
O	INDEOREX INC	12- 23	15	-1 1/4	-7.6

O	INFORMATION DISPLAYS	1- 2	1	+ 1/8	+14.2
O	INFORMATION INTL INC	11- 15	10 3/4	-1	-8.5
A	LUNDY ELECTRONICS	4- 9	4 5/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0
A	MILGO ELECTRONICS	17- 28	18 1/4	-2 1/2	-12.0
N	MOHAWK DATA SCI	6- 13	5 7/8	0	0.0
O	ODEC COMPUTER SYST.	3- 6	3 1/2	- 1/2	-12.5

O	OPTICAL SCANNING	2- 7	3 1/2	-1 3/4	-33.3
O	PERTEC CORP	5- 8	5	- 1/4	-4.7
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	4- 9	4 5/8	- 1/2	-9.7
O	PRECISION INST.	2- 6	2 1/2	0	0.0
O	RECOGNITION EQUIP	4- 8	4 1/4	- 1/4	-5.5
N	SANDERS ASSOCIATES	9- 18	9	- 5/8	-6.4

O	SCAN DATA	2- 6	2 1/4	- 1/4	-10.0
O	STORAGE TECHNOLOGY	17- 34	18	-3 1/2	-16.2
O	SYCOR INC	9- 13	12 1/2	- 1/2	-3.8
O	TALLY CORP.	3- 14	5 1/4	+2 1/8	+68.0
N	TEKTRONIX INC	34- 53	33 7/8	-5 1/8	-13.1
N	TELEX	4- 6	4	- 3/8	-8.5
O	WILTEK INC	13- 18	12	- 1/2	-4.0

SUPPLIES & ACCESSORIES

O	BALTIMORE BUS EORMS	5- 9	7 1/4	+ 1/4	+3.5
A	BARRY WRIGHT	8- 13	8 1/8	- 1/4	-2.9
A	DATA DOCUMENTS	18- 22	19 3/8	- 1/2	-2.5
O	DUPLEX PRODUCTS INC	8- 10	7 3/4	- 1/4	-3.1
N	ENNIS BUS. FORMS	6- 8	5 3/4	- 1/4	-4.1
O	GRAHAM MAGNETICS	13- 20	13	-1 1/2	-10.3
O	GRAPHIC CONTROLS	10- 12	10	- 1/8	-1.2

E	1973	CLOSE	WEEK	WEEK
X	RANGE	APR 26	NET	PCT
C	(1)	1973	CHNGE	CHNGE
H				

N	3M COMPANY	78- 89	80 1/8	-2 7/8	-3.4
D	MOORE CORP LTO	55- 60	59 1/8	-1 1/8	-1.8
N	NASHUA CORP	42- 58	44 3/4	- 3/8	-0.8
D	REYNOLDS & REYNOLD	44- 51	44 1/8	-4	-8.3
O	STANDARD REGISTER	16- 20	17 1/2	-1 1/2	-7.8
D	TAB PRODUCTS CO	14- 23	14	0	0.0

N	UARCO	19- 23	19 1/4	+ 1/4	+1.3
A	WABASH MAGNETICS	6- 7	6	- 1/4	-4.0
N	WALLACE BUS EORMS	21- 26	21	- 3/8	-1.7

COMPUTER SYSTEMS

N	BURRDUIGHS CORP	219-245	219 5/8	-10 1/8	-4.4
N	COLLINS RADIO	19- 26	18 1/2	-1 1/8	-5.7
N	CONTROL DATA CORP	42- 62	45 5/8	-2 3/8	-4.9
O	DATA GENERAL CORP	33-131	33 3/4	-4 1/4	-11.1
D	DIGITAL COMP CONTRDL	3- 6	3	- 1/4	-7.6
N	DIGITAL EQUIPMENT	73-105	80 3/4	-2 1/8	-2.5
N	ELECTRONIC ASSOC.	5- 9	5 3/8	- 7/8	-14.0

A	ELECTRONIC ENGINEER.	8- 11	7 3/4	-2 1/4	-22.5
N	EOXBORD	25- 32	25 1/8	-1	-3.8
D	GENERAL AUTOMATION	26- 55	30 1/2	-3 1/4	-9.6
O	GRI COMPUTER CORP	1- 3	1 1/8	- 1/8	-10.0
N	HEWLETT-PACKARD CO	80- 95	82 3/8	-1	-1.1
N	HONEYWELL INC	106-139	109 7/8	-8	-6.7
N	I8M	405-457	409 3/4	-19 1/4	-4.4

O	INTERDATA INC	7- 13	10 1/4	-1 1/4	-10.8
N	MEMOREX	6- 19	7 1/8	+ 1/8	+1.7
O	MICRODATA CORP	6- 10	6 3/8	- 3/8	-5.5
N	NCR	27- 34	33	- 1/4	-0.7
N	RAYTHEON CO	26- 34	26 7/8	-2 7/8	-9.6
N	SPERRY RAND	39- 50	39 7/8	-1 5/8	-3.9
A	SYSTEMS ENG. LABS	4- 8	4	0	0.0

N	VARIAN ASSOCIATES	13- 20	13 3/8	- 5/8	-4.4
N	WANG LABS.	18- 34	18 3/4	-1 1/4	-6.2
N	XEROX CORP	145-169	149	-5 3/4	-3.7

LEASING COMPANIES

A	800THE COMPUTER	2- 5	2 3/8	0	0.0
O	BRESNAHAN COMP.	1- 2	1 7/8	- 1/8	-6.2
D	COMOISCO INC	11- 17	9 1/8	-1 1/8	-10.9
O	COMMERCE GROUP CORP	4- 4	3 3/4	- 1/8	-3.2
O	COMPUTER EXCHANGE	1- 1	5/8	0	0.0
A	COMPUTER INVSTRS GRP	3- 8	3 3/8	- 3/8	-10.0
O	COMP. INSTALLATIONS	2- 2	2	0	0.0

N	OPE INC	6- 9	6 1/2	0	0.0
M	DATRONIC RENTAL	2- 3	2 3/8	0	0.0
A	OCL INC	2- 3	1 7/8	+ 1/4	+15.3
A	DEARBORN-STORM	15- 26	16 3/8	- 7/8	-5.0
A	OPA, INC.	5- 8	5 1/8	- 3/8	-6.8
A	GRANITE MGT	3- 6	3	- 1/2	-14.2
A	GREYHOUND COMPUTER	4- 6	4 5/8	+ 1/8	+2.7

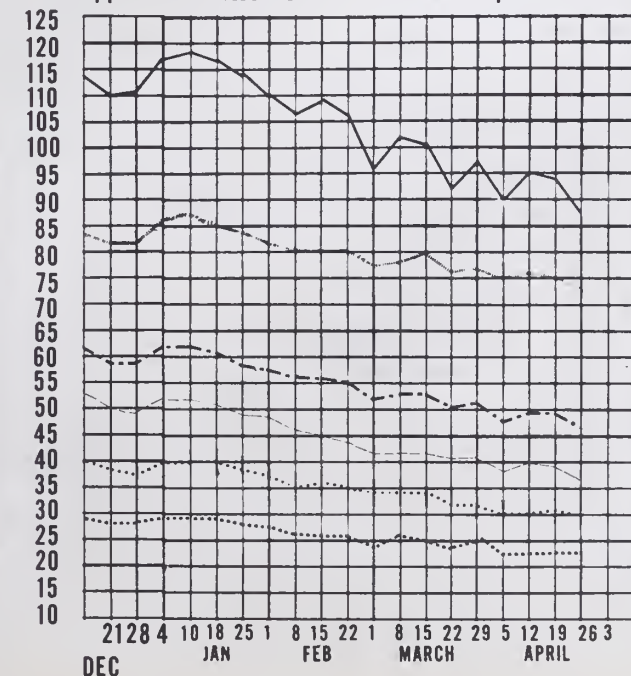
A	ITEL	7- 12	7 1/4	- 1/8	-1.6
N	LEASCO CORP	9- 18	10 1/2	0	0.0
O	LEASPAC CORP	5- 8	5 1/2	-1 1/2	-21.4
O	ELECTRO MGT INC	1- 2	7/8	- 1/8	-12.5
A	LOCKWOOD COMPUTER	2- 3	1 3/4	+ 1/4	+16.6
O	SYSTEMS CAPITAL	7- 15	8	- 3/8	-4.4
N	U.S. LEASING	24- 36	25 1/4	-1	-3.8

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

COMPUTER STOCKS TRADING INDEX

— Computer Systems — Software & EDP Services
..... Peripherals & Subsystems Leasing Companies
..... Supplies & Accessories CW Composite Index



Earnings Reports

MEMOREX

Year Ended Dec. 31

	1972	1971
Shr Ernd	\$.30
Revenue	145,422,000	\$110,201,000
Earnings	1,193,000	(13,390,000)

MICROFORM DATA SYSTEMS

Six Months Ended Jan. 26

	1973	1972
Revenue	\$879,140	\$322,498
Loss	872,828	1,223,463

MACRODATA

Year Ended Dec. 31

	1972	1971
Shr Ernd	\$.92	\$.58
Revenue	4,699,343	2,649,635
Tax Cred	210,500	160,000
Earnings	599,286	356,530

COMPUTER COMMUNICATIONS

Three Months Ended Dec. 31

	1972	a1971
Shr Ernd	\$.02
Revenue	1,645,605	\$2,292,150
Disc Op	(29,417)	(216,154)
Spec Cred	b14,000
Earnings	42,162	(407,769)
6 Mo Shr	.08
Revenue	3,189,113	2,989,940
Disc Op	(29,417)	(403,887)
Spec Cred	b64,000	b118,660
Earnings	142,983	(916,698)

a-Restated. b-In 1972, consists of tax-loss carryforward less loss on sale of subsidiary; in 1971, gain on sale of subsidiary.

MINICOMPUTER SYSTEMS

Year Ended Oct. 31

	1972	1971
Shr Ernd	\$.13	\$(.76)
Revenue	629,002	441,269
Tax Cred	15,000
Earnings	38,520	(151,060)

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per dozen

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